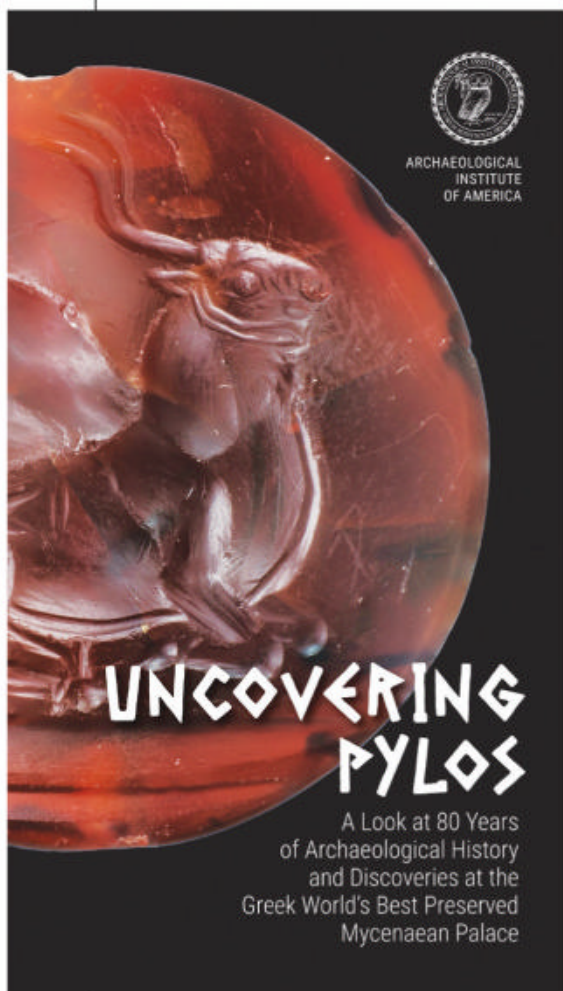




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UNCOVERING PYLOS



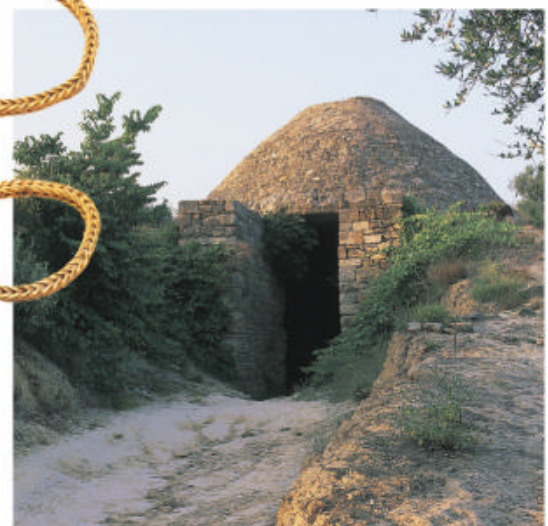
In 1939, an archaeological team led by University of Cincinnati professor Carl Blegen unearthed the first traces of what would soon be recognized as the ancient Greek city of Pylos and the fabled Palace of Nestor. Celebrated as one of the greatest discoveries of its time, it would forever change the study of Aegean prehistory. The 3,200-year-old ruins are the best-preserved Mycenaean palace

complex ever excavated in Greece, and the hundreds of inscribed Linear B tablets found there have provided archaeologists with a unique window into how these Bronze Age centers functioned.

Almost eight decades later, the legendary site continues to reveal its incredible hidden treasures. Additional discoveries in 2015 and 2017 would once again indelibly change the field of Aegean Bronze Age archaeology: the grave of the so-called Griffin Warrior and two monumental tholos tombs. The burials contained a trove of finely crafted objects that have provided even more new information about the people who lived and died in Pylos thousands of years ago. These new discoveries continue to prove what an exceptional place ancient Pylos once was, and that, although the site has been investigated by archaeologists for more than three-quarters of a century, there is still much to be learned today while Uncovering Pylos.

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THE DECADE'S 10 MOST EXTRAORDINARY DISCOVERIES

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A publication of the Archaeological Institute of America

January/February 2021

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the Great
Arab
Revolt**

**Lost Oasis
Cities of the
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CONTENTS



12 Feline geoglyph, Nazca Desert, Peru

FEATURES

24 ARCHAEOLOGY MAGAZINE'S TOP 10 DISCOVERIES OF 2020*

*AND THE DECADE

BY THE EDITORS

36 RETURN TO THE RIVER

Members of Virginia's Rappahannock tribe are at work with archaeologists to document the landscape they call home

BY MARLEY BROWN

40 AN OASIS CIVILIZATION REDISCOVERED

In the deserts of Central Asia lie the ruined cities of a lost Bronze Age world

BY MEGAN GANNON

48 UNFOLDING THE BAYEUX TAPESTRY

A new theory may explain the origins of the famed medieval textile

BY JASON URBANUS

50 BEHIND THE LINES OF THE GREAT ARAB REVOLT

Along an abandoned railroad, traces of a bitter WWI-era guerilla conflict have emerged from the sands

BY SAMIR S. PATEL

Cover: A painted wooden sarcophagus, dating to Egypt's 26th Dynasty (688–525 B.C.), unearthed at the Saqqara necropolis

PHOTO: COURTESY EGYPTIAN MINISTRY OF TOURISM & ANTIQUITIES



DEPARTMENTS

4 EDITOR'S LETTER

6 FROM THE PRESIDENT

8 LETTERS

Picturing the past, the skill of Nubian artists, a vegetable garden still, and a possible case of subversion

9 DIGS & DISCOVERIES

Siberian mummy mask, Maya sweat bathing, ancient Greek editors, Persian metallurgy, and a new Nazca cat

20 OFF THE GRID

Ouro Preto, Brazil

22 AROUND THE WORLD

Peopling the Caribbean, Scythian warrior couple, dogs of the First Nations, and a stonemason's inside joke

68 ARTIFACT

Praying inside the box

LETTER FROM WOODHENGES

59 STONEHENGE'S CONTINENTAL COUSIN

A 4,000-year-old ringed sanctuary reveals a German village's surprising connections with Britain

BY ANDREW CURRY

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■ MORE FROM THE ISSUE For additional information about some of our Top 10 Discoveries of the Decade, see archaeology.org/decade.

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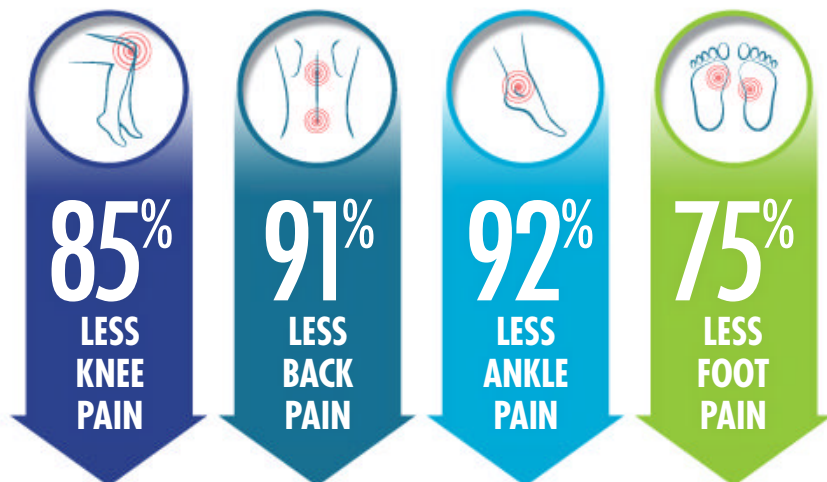
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EDITOR'S LETTER

OUR FAVORITE THINGS

We know we aren't supposed to pick favorites, whether among children, pets, or articles in the magazine, but we have to admit that it would be hard for a team of editors not to love "Formatting Bronze Age Tablets," which appears in this issue's Digs & Discoveries section. The image of ancient Greek scribes toiling away at their tablets more than 3,000 years ago and devising ways to make their work clear and comprehensible definitely struck a chord with us. Thankfully, we don't have to edit lists of bushels of grain or flocks of sheep like those scribes did, and instead can bring you our annual Top 10 Discoveries. There were so many wonderful finds from which to choose, including nearly five dozen mummies in their painted sarcophagi from the Egyptian necropolis of Saqqara. You'll also read about the surprising results of the largest-ever study of Viking DNA and a possible long-lost shrine dedicated to Rome's eponymous founder, Romulus. The news that archaeologists have developed a revolutionary method to pinpoint the dates of pottery found at ancient sites is yet another reminder that 2020 was a remarkable year of discovery.



We also have something completely new to share with you in this issue. For the first time, we bring you our selection of the Top 10 Discoveries of the Decade. Some of you will remember these stories from previous issues, and we hope you will find some familiar friends among them. For this issue, we have gone back to the researchers and asked them what they have learned since they first made their discovery, and what they feel its long-term impact on the field has been. We know you will find these updates fascinating—we certainly do!

This has been a most difficult year, and I want to extend my thanks to so many of you who have taken the time to write to us and share that *ARCHAEOLOGY* magazine has been a valued companion during the months you have been confined to your homes more than usual. It's our hope that we have provided you with an escape to a larger world that has been temporarily closed to us all. We wish you a very happy and healthy 2021 as we go on toward the future—always remembering our past.

Jarrett A. Lobell
Editor in Chief

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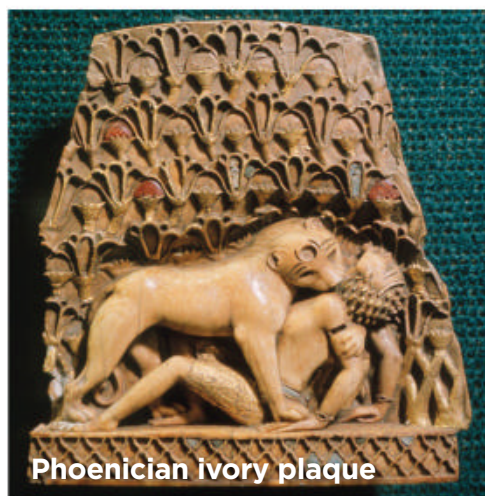
— H., Arvada, CO



FROM THE PRESIDENT

PROTECTING HERITAGE

I write to you in this issue as an advocate for the protection of archaeological sites from theft and desecration. I know you as *ARCHAEOLOGY* readers share my interest and passion for the preservation of the world's heritage.



Phoenician ivory plaque

The year 2020 marked the 50th anniversary of the 1970 UNESCO Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property. This treaty is the primary international mechanism to halt the illicit trade of antiquities. The Archaeological Institute of America (AIA) has been a strong supporter of the 1970 Convention from the beginning. Archaeologists deplore the looting of sites because it harms our ability to learn from the past, deprives communities of opportunities for public education and tourism at ancient sites, and contributes to international criminal networks.

Our best way to protect archaeological sites from looting is to restrict the market for illicitly trafficked antiquities. In the United States these restrictions are set up through a system of bilateral agreements with individual countries, which the AIA comments on, just as with any other government regulation.

In addition to emergency import restrictions that have been imposed on archaeological and ethnological materials from Iraq, Syria, and Yemen, the United States has agreements with 19 countries: Algeria, Belize, Bolivia, Bulgaria, Cambodia, China, Colombia, Cyprus, Ecuador, Egypt, El Salvador, Greece, Guatemala, Honduras, Italy, Jordan, Libya, Mali, and Peru. These agreements have to be reviewed and can be renewed (or not) every five years. In 2020, AIA archaeologists spoke in support of agreements with Bolivia, Colombia, Greece, Italy, and Turkey and for new requests from Nigeria and Tunisia. *ARCHAEOLOGY* readers can write in support of these agreements, too—for example, for the U.S.-Egypt agreement coming up in 2021. Information will be posted at archaeological.org.

The AIA also works with other organizations to discourage the theft of archaeological heritage. The Antiquities Coalition has recently published its 10 Most Wanted Antiquities list, which includes the eighth-century B.C. Phoenician gold and ivory plaque from the Assyrian palace of Ashurnasirpal, pictured above. The plaque was looted from the Iraq Museum in Baghdad in April 2003. Fascinating objects like this one reflect but a tiny fraction of the heritage lost to the public through illicit trafficking of cultural property. As organizations and individuals working together, we can make a difference in the fight against the looting of our heritage.

Laetitia La Follette

President, Archaeological Institute of America

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Laura Linkletter Rich, the Vice President of Outreach & Education for the AIA, digs at Binchester Roman Fort near Hadrian's Wall in northern England.

"My life has been so enriched by archaeology and historic sites. It's important to me to do everything I can to support the next generations of students and to help preserve the places and artifacts that have so inspired me. Joining the Norton Society is an easy way to help the AIA continue this mission."

FROM OUR READERS

OUR STORY

The Editor's Letter about the telling of stories throughout our lives in the September/October 2020 issue made me realize that is why I enjoy your magazine so much. ARCHAEOLOGY does tell a story—it tells many stories—and I read it front page to last page just to get those stories. My mind pictures everything I read that the pictures don't always show.

Connie L. Jansen
Seattle, WA

AN AMAZING BEING

I enjoy every issue of the magazine that comes, cover to cover. ARCHAEOLOGY entertains and enlightens. I read with fascination "Weaving for Their Ancestors" (November/December 2020) by Roger Atwood, in which he describes the Oculate Being as having a snake-like tongue and cat's whiskers. It also has a monkey's head, which makes it one of the more interesting zoomorphic gods in the pantheon. Keep up the good work. In these shut-down times, ARCHAEOLOGY is more valuable than ever.

Susan James
La Canada, CA

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MASTER MAKERS

I was fascinated by the giraffe effigies made out of mica in "A Nubian Kingdom Rises" in the September/October issue. I do pearl inlay, so I was intrigued about how they could have cut those out all



those years ago without the fine scroll blades that I use for cutting pearl. Plus, mica is so fragile. But, I did it! [See above.] I still wonder what he/she used to cut out those delicate pieces.

Maureen Mathieu
Westbrook, ME

SECRET SUBVERSION?

In "Canada's Forgotten Capital" (November/December 2020), the carved British royal arms recovered by Robert Kaplan are shown with the lion to the viewer's left, the unicorn to the right, as is heraldically correct. In the watercolor of the Parliament chamber on the same pages, the arms are depicted with the unicorn to the left. This cannot be a reversal of the printed image, because the first and third quarters correctly show the three lions of England

on a red ground, the second quarter the rampant lion of Scotland on gold, and the fourth quarter the Irish harp on its green-blue ground. It looks as though the artist either suffered a memory lapse when painting the scene or was quietly subverting royal imagery.

Norman Hammond
Emeritus Professor
Boston University
Boston, MA

GRANDPA'S GARDEN

"Alcohol Through the Ages" (November/December 2020) was incredibly interesting, and the section on the moonshine era in the United States brought to mind a family story. Living in a small village in Maine's western mountain region, my husband's grandfather built a still during the Depression to help sustain his large family. (We're pretty sure he kept some of the product back for his own enjoyment!) When he got wind that revenuers were making rounds in the area to visit suspected lawbreakers, he buried the still in the vegetable garden. The agents had been tipped off that he was one of the moonshiners in Franklin County because they stopped by to question him and inspect the property. He welcomed them warmly and gave them a tour of the place, showing off his garden and walking them right over the buried still.

Arolyn Childs
Fairfield, ME



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DIGS & DISCOVERIES

BRONZE AGE EDITORS, NEW NAZCA CAT, PERSIAN STEEL, SIBERIAN MUMMY MASK...AND MUCH MORE

READING, WRITING, AND ALGORITHMS

Scholars have long debated how widespread literacy was among the Israelites of the seventh century B.C., during the last decades before the ancient kingdom of Judah fell to the Babylonians and its people went into exile. If this were known, it could help determine whether certain books in the Hebrew Bible, such as Deuteronomy, Judges, and Kings, which narrate the kingdom's rise, were composed—and possibly read by the broader populace—during this period. Now, a team of researchers at Tel Aviv University, including a mathematician and a police investigator, studying 2,700-year-old Hebrew inscriptions have found evidence of a surprisingly high rate of literacy at the time.

Convinced that modern technology can be used to decipher the past, the team developed algorithms designed to estimate how many different people contributed to a set of writings found at the site of Tel Arad, in the desert of southern Israel. First excavated in the 1960s, Tel Arad contains a military fortress that housed between 20 and 30 soldiers in the seventh century B.C. One of a series of fortresses throughout Judah, the Israelite kingdom that prospered in the late eighth and seventh centuries B.C., Tel Arad was isolated and distant from the capital in Jerusalem. This, explains archaeologist Israel Finkelstein, professor emeritus at Tel Aviv University, makes it a good laboratory

for evaluating writing ability among average soldiers.

More than 100 inscribed potsherds have been unearthed at Tel Arad, representing the largest corpus of writings from Judah. These mainly consist of lists of food and other necessities or references to the movement of soldiers and supplies. “They are primarily mundane writings, similar to today’s



Inscribed potsherds, Tel Arad, Israel



Post-its,” says Arie Shaus, an archaeologist and applied mathematician at Tel Aviv University. Along with colleagues specializing in image processing and artificial intelligence, Shaus built a database of the stylistic similarities and differences among the letters in 18 of the Tel Arad samples, and developed algorithms to compare the inscriptions. These algorithms have determined that at least four, and possibly up to seven, different people produced the selected writing samples.

To provide another perspective, the team invited former Israel Police superintendent Yana Gerber, who spent 27 years evaluating handwriting for criminal cases, to examine the sherds. Gerber, who also has a degree in archaeology and ancient Greek, estimated that at least 12 different writers contributed

to the collection. She based her conclusion on the general appearance and flow of the writing, as well as the spacing, slant, alignment, and size of the letters. “Experienced writers wrote the majority of the inscriptions,” Gerber says, “while a few demonstrate poorly trained hands.” Shaus believes that, at this point, Gerber’s analysis is likely more accurate than the algorithms’. He notes, though, that the algorithms’ usefulness will increase as data sets grow larger. “This was a small and challenging set of data for an algorithm,” Shaus says, explaining that many of the Tel Arad inscriptions were not in good enough condition to analyze. “If you had more data to train it, that would help.”

If Gerber’s interpretation of the Tel Arad inscriptions were applied through-

out the kingdom of Judah, which was home to around 100,000 people in the seventh century B.C., it would suggest, Finkelstein says, that “at minimum, several hundred people knew how to write.” He notes that this would add credence to the idea that the Biblical historical texts were written before the Babylonian conquest in 597 B.C. The team’s findings also reveal that the ability to write was not confined to royal scribes, but had spread to at least some in the military ranks. “It reflects on the development of a writing culture in the kingdom,” says Finkelstein. This level of literacy, the researchers suggest, could also indicate an environment ripe for the dissemination and appreciation of these texts among the Israelites.

—SARA TOTH STUB

FACE OFF

The Tashtyk culture, which existed between the first and seventh centuries A.D. in southern Siberia, is known for its elaborate burial customs, including applying layers of gypsum onto the deceased’s face to create lifelike death masks. A stunning example of this practice—the mummified remains of a man buried some 1,700 years ago wearing a painted red death mask—was discovered in the late 1960s in the Khakassia region. More than half a century later, researchers from Russia’s Hermitage Museum have finally managed to glimpse the man’s face.

Since removing the mask would damage the mummy, the researchers instead conducted a CT scan to peer beneath the facial covering. The scan revealed that the man had a nasty gash across the left side of his face, running from his eye to his ear, that had been sutured shut prior to his burial. Experts believe the wound may have been fatal, and that it was stitched



Gypsum-encased skull



up after the man died so he would not have to go to the afterlife with a disfigured appearance. The scan also showed that the man’s skull has a two-to-three-inch hole in its left temple, likely resulting from the removal of his brain during his funerary ceremony.

—JASON URBANUS

FORMATTING BRONZE AGE TABLETS

Although they were only meant to be kept for a year or so, administrative documents recording the people and goods controlled by the palaces of Late Bronze Age Greece (ca. 1400–1200 B.C.) show signs of having been carefully edited to present information in a clear, orderly fashion. The documents, which were written on clay tablets using a script known as Linear B, have only survived because they were accidentally fired and hardened when the buildings in which they were stored burned.



Clay tablet

In the case of a tablet (below), listing offerings to various deities at the palace of Pylos, says Anna P. Judson, a research fellow at the British School at Athens, these edits affected how the entire document was organized. On the tablet's front side, the scribe worked out a way of presenting the list by writing "At Pylos..." in large script and then applying this heading to a number of different offerings. On the back, the scribe put this system into practice throughout. "The fascinating thing about this is that you can see the decision-making process happening," says Judson. "You can see this person 3,000 years ago in the middle of writing something stop and think, 'Wait, should I do this a different way?'"

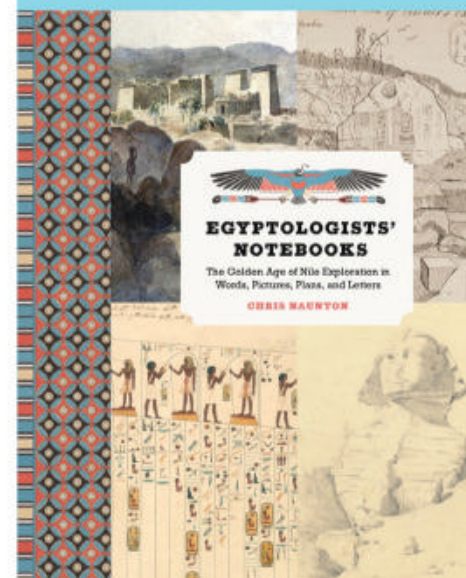
Another tablet (above) from Pylos that records the amount of bronze allocated to a number of different smiths also shows signs of having been edited on the fly. After enumerating how much bronze each smith received, the scribe wrote the total amount of bronze distributed, then erased the sum and wrote it again on the next line. The scribe left another line blank before starting the next paragraph, allowing the total to stand out clearly.

Clay tablet
(front and back)



—DANIEL WEISS

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CAT'S EYE VIEW



Feline geoglyph, Nazca Desert, Peru

While restoring a viewing area overlooking the Nazca Lines in the desert of southern Peru, archaeologists noticed the previously undocumented traces of a cat geoglyph crouching on a steep hillside. The 121-foot-long outline of a feline was badly eroded but has since been cleaned and conserved. Based on its resemblance to depictions of Andean cats frequently found on textiles, ceramics, and petroglyphs produced by the Paracas culture, researchers have

dated the figure to around 200 B.C. This means it predates the creation of many Nazca geoglyphs by some 400 years. “This feline seems to have been part of Paracas religious cosmology of the time,” says archaeologist Johny Isla of Peru’s Ministry of Culture. “The cat was considered a deity that represented dominion over the earth, together with the killer whale and condor that signified dominion over water and air.”

—BENJAMIN LEONARD

THE BONE COLLECTOR

The date of the earliest known bone point has been pushed back by 700,000 years, says paleoanthropologist Michael Pante of Colorado State University. While reexamining

a collection of bones that had been recovered from Tanzania’s Olduvai Gorge by renowned fossil hunter Mary Leakey, Pante noticed that some show signs of having been shaped by human hands. One of the artifacts appeared to be an unfinished bone point with barbs carved into its side. An international team that included Pante analyzed the tool and concluded that the bone had been flaked using a hammer stone or another object. It had also been scraped and polished.

The bone point has been dated to 800,000 years ago, at which time *Homo erectus* lived at Olduvai. This species is known to have made bone hand axes that look similar to the stone Acheulean hand axes they used as all-purpose butchery tools. Bone hand axes that are more than a million years old have also been found at Olduvai and at the site of Konso in Ethiopia. According to Pante, making bone tools is one of the markers of our hominin ancestors achieving modern human behavior. “Now that we see [this ability developing] much earlier,” he says, “we can say that *Homo erectus* was a lot more human than we would have originally thought.”

—ZACH ZORICH



Bone point (four views)

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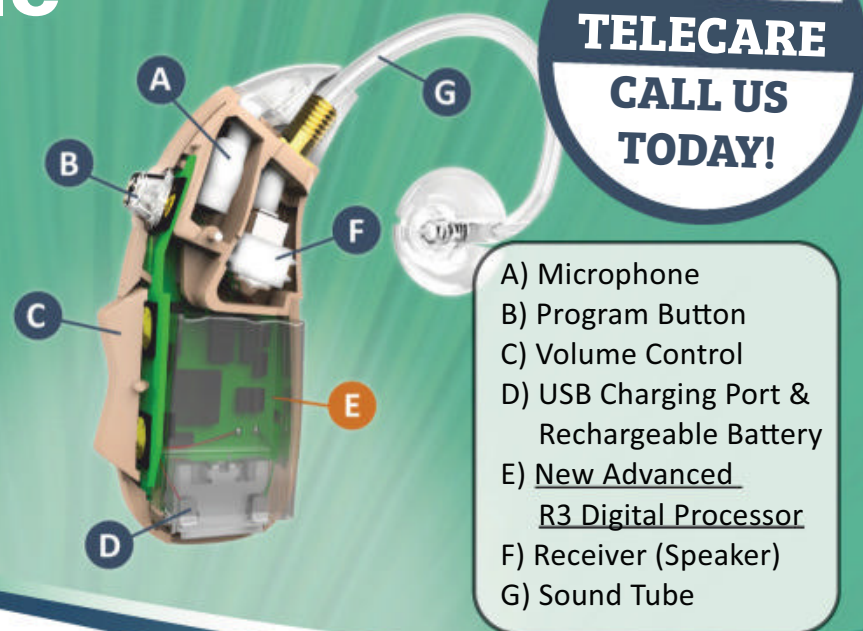
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Terracotta
mask

WHO IS THAT MASKED GOD?

A nearly intact terracotta mask depicting the Greek god Dionysus was unearthed by a team led by Kaan İren of Muğla Sıtkı Koçman University on the acropolis of the ancient city of Daskyleion in western Turkey. The artifact likely dates to the end of the fourth century B.C., when the multicultural city—which had previously been controlled by the Phrygians, Lydians, and Persians—was subject to Greek influence following Alexander the Great’s invasion of the region in 334 B.C. In addition to his role as the god of wine and fertility, Dionysus was the patron of theater and impersonation. Masks were common elements of rituals honoring the deity, and were frequently worn by his followers during cult ceremonies. Researchers believe this particular mask was a votive object offered to the god during a winemaking ritual.

—BENJAMIN LEONARD



Acropolis,
Daskyleion, Turkey



PERSIAN STEEL

As early as the eleventh century A.D., Persians added chromium to iron to produce a strong type of steel that could be made into tools, armor, and weapons. Guided by medieval texts that describe areas where steel was manufactured, Rahil Alipour, an archaeologist at University College London, located a site named Chahak in southern Iran. There, she found broken ceramic molds called crucibles in which steel had been made, as well as slag, the waste product of metal production. Embedded in the slag were droplets of steel that were found to contain between 1 and 2 percent chromium by weight. "That might not sound like much," says Alipour, "but it really does make a difference in the mechanical properties of steel."

Among the evidence that chromium was intentionally added is a tenth- or eleventh-century recipe for crucible steel recorded by the Persian polymath Abu-Rayhan Biruni. The recipe includes an ingredient called *rusakhtaj*, which translates to "the burned." Alipour notes that the mineral chromite, a form of chromium readily available near Chahak, is black, which may explain the description of the material in the recipe as burned. The area also has plentiful iron deposits. "We know that people of the past would choose their production centers around the materials they needed," she says, "so that may be the reason why they chose Chahak."

The steel droplets also contain around 2 percent phosphorous, which would have lowered the metal's melting temperature,

making it easier to produce. But the phosphorous would have made the finished product more fragile. This accords with historical accounts that blades made with Chahak steel sold for a high



Broken crucible

price, but often proved brittle and rapidly lost their value. Alipour says it's unclear whether phosphorous was intentionally added to the mix.

—DANIEL WEISS



Slag attached to crucible wall

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HEAD SPACE

When archaeologists first excavated a fifth-century A.D. cemetery in Pannonia, an ancient Roman province in present-day western Hungary, they found that a large portion of those buried there had intentionally deformed skulls. In all, 51 of 96 men, women, and children interred in the Mözs-Icsei dűlő cemetery between around A.D. 430 and 480 had elongated, oblong heads.

To learn more about the people buried in the cemetery, Zsófia Rácz, an archaeologist at Eötvös Loránd University, and her colleagues performed isotope analysis on samples taken from the skeletons' bones and teeth. The results showed that 23 of the people had strontium isotopes that are not found locally, suggesting that they came from elsewhere. All these newcomers had modified skulls, leading Rácz and her team to conclude that this practice was imported and introduced to the local Pannonians, some of whose skeletons also have oblong heads.

The researchers aren't certain why skull modification took hold in this region of the Carpathian Basin after the fall of the Roman Empire, but Rácz speculates that the unusual skull shapes may have been a way of cultivating group identity. "This kind of modification can be a tool for creating or maintaining different social identities," she says. "It may signify status, ethnicity, familial affiliations, or communal affiliations."

—JOSHUA RAPP LEARN



Elongated skulls
(side and front views)

SACRED STONE OF THE SOUTHWEST IS ON THE BRINK OF EXTINCTION



Centuries ago, Persians, Tibetans and Mayans considered turquoise a gemstone of the heavens, believing the striking blue stones were sacred pieces of sky. Today, the rarest and most valuable turquoise is found in the American Southwest— but the future of the blue beauty is unclear.

On a recent trip to Tucson, we spoke with fourth generation turquoise traders who explained that less than five percent of turquoise mined worldwide can be set into jewelry and only about twenty mines in the Southwest supply gem-quality turquoise. Once a thriving industry, many Southwest mines have run dry and are now closed.

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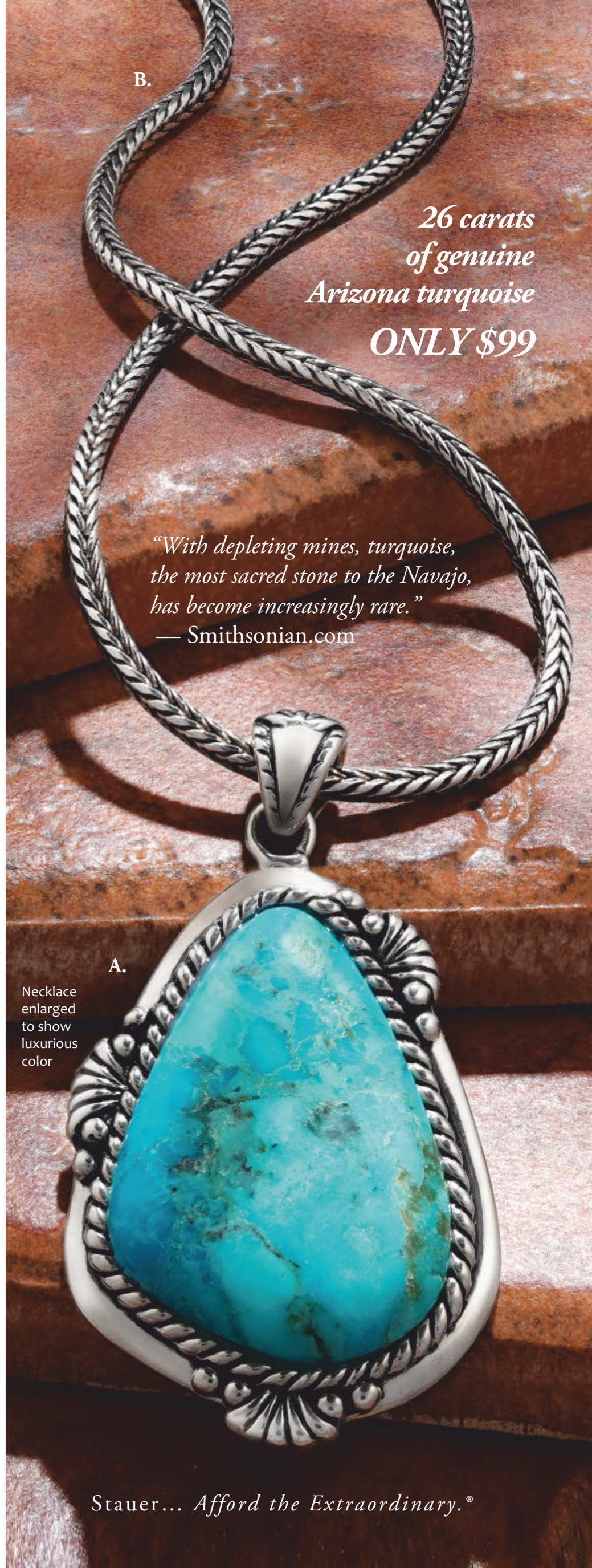
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OFFERINGS AT SEA

When hundreds of Phoenician ceramic figurines and vessels were first recovered from the seafloor off northern Israel almost 50 years ago, archaeologists interpreted the artifacts as cargo from a fifth-century B.C. shipwreck. Now, University of Haifa archaeologists Meir Edrey, Adi Erlich, and Assaf Yasur-Landau have reassessed the artifacts and determined that they were deliberately cast into the water, likely as part of a ritual that was repeated from the seventh through third centuries B.C.

Unlike other Phoenician caches of ritual statuettes, Edrey explains, all the figurines retrieved from the site depict women. "Some have protruding bellies or a hand placed over the abdomen,



Ceramic figurines

and others are even carrying children," he says. "These attributes suggest that this assemblage was related to a specific cult connected with fertility and childbearing." A few of the figurines portraying pregnant women bear the symbol of the Phoenician goddess Tanit. This symbol appears frequently in inscriptions at some central Mediterranean sites where infants were sacrificed in exchange for divine favor. Says Edrey, "These figurines could represent a local manifestation of this practice, in which they might have been used as a substitute for actual human infants who were often promised even before they were born."

—BENJAMIN LEONARD

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BATHING WITH THE TOAD GODDESS

Sweat bath, Xultun, Guatemala



To the Maya people living in the city of Xultun in Guatemala's Petén rain forest, a sweat bath was a sacred place symbolizing the circular nature of time and the cycle of birth and death. In excavations of Xultun's sweat bath over the past decade, archaeologist Mary Clarke of Boston University has found that the building is painted with images of a goddess who has the features of toads and iguanas. A person entering and leaving the sweat bath, Clarke says, would have metaphorically passed through the body of the goddess in an act of death and rebirth. Radiocarbon dates establish that the Xultun sweat bath was first used from A.D. 562 to 651. It was then ceremonially buried. A combination of radiocarbon and ceramic typology dating revealed that the sweat bath was later uncovered and reused from A.D. 850 to 971, when Xultun was beginning to decline. Clarke has unearthed a large cache of offerings to the goddess, including toad and iguana carcasses, the remains of a young person, and large numbers of pottery sherds and stone tools. Why the sweat bath was reopened is not clear, but Clarke thinks it may have been an attempt by the people of Xultun to appeal to the goddess to heal their overexploited environment.

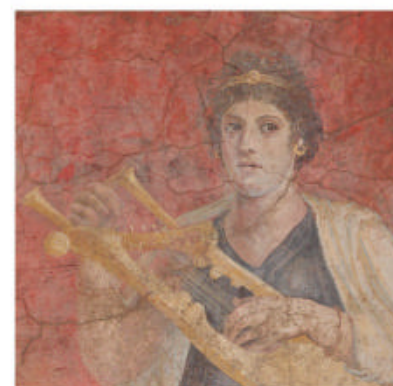


Toad goddess

—ZACH ZORICH

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OURO PRETO, BRAZIL



The mining city of Ouro Preto, in south-eastern Brazil, is one of the best-preserved colonial settlements in the New World. Tens of thousands of Europeans, Africans, and Indigenous people flooded the mountainous region surrounding the city after major gold deposits were discovered there in the 1690s. In the late seventeenth century, the area was home to hundreds of Indigenous groups, mostly speakers of the Jê language group. At the end of the eighteenth century, when the area's gold deposits began to diminish and profits dwindled, Ouro Preto was one of the wealthiest and most populous urban centers in South America. The city is noted for its baroque architecture and public artwork, much of which is attributed to the architect and sculptor Antônio Francisco Lisboa, more commonly known as Aleijadinho. It is also famous for its role in several important conflicts. These include the 1706-1709 War of the Emboabas, a struggle among competing factions of Europeans for control



over land, slaves, and natural resources, and the 1789 Minas Conspiracy, a failed bid for independence from Portugal.

Archaeologist Luana Campos Akinruli of the Federal University of Minas Gerais

says that while histories of Ouro Preto have focused on these Eurocentric events, archaeology has begun to shed light on the experiences of Ouro Preto's African and Indigenous populations. "Recently, a panel of graffiti attributed to individuals living in a basement senzala, a slave quarters, was found in a building in the historical center," she says. "It's a treasure that can tell us much about the daily lives of enslaved African and Afro-Brazilian peoples." Additional archaeological sites in Ouro Preto relating to mining, including the Chico Rei Mine and the Morro da Queimada Archaeological Park, present interpretations of colonial-era mining and the traditional African mining knowledge that was integral to the industry's success.

THE SITE

Walking tours of Ouro Preto are available from a number of outfits. If you choose to design your own route, however, anthropologist Manuel Lima Filho of the Federal University of Goiás suggests beginning at the Church of Santa Efigênia, an eighteenth-century baroque masterpiece on a hill overlooking the city. The construction of the church is believed to have been funded by—and the building has long been associated with—the city's Afro-Brazilian community. From there, walk along the cobbled streets toward the Praça Tiradentes, the city's main square, which is named for a martyr of the Minas Conspiracy. In addition to visiting the Chico Rei Mine and the Morro da Queimada Archaeological Park, Lima Filho recommends stops at museums devoted to the Minas Conspiracy and to the life and work of the architect Aleijadinho.

WHILE YOU'RE THERE

Drive just over two hours west of Ouro Preto to visit the Inhotim Institute, an open-air contemporary art museum and botanical garden that covers thousands of acres and features the works of renowned international artists.



Ouro Preto, Brazil

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CANADA: Domesticated dogs have played an integral role in Indigenous life for thousands of years, used for transportation, hunting, and protection. First Nations archaeological sites throughout the Pacific Northwest in particular contain plentiful remains of a special type of woolly dog. These small canines were prized for their coats, which were sheared like sheep pelts. The wool was then used to create blankets, garments, and belts. The dogs are believed to have gone extinct after European-made textiles became widely available.



SPAIN: For the past 800 years, millions of pilgrims have journeyed to the Cathedral of Santiago de Compostela. Very few, if any, have noticed a quirky feature on a column tucked away in a dark corner 40 feet above the cathedral's floor. It appears that an anonymous medieval stonemason cheekily carved a small self-portrait into the building. Probably intended as an inside joke to be seen by his fellow artisans alone, the 11-inch-tall figure was only recently observed.



GUATEMALA: Some 2,000 years ago, the Maya inhabitants of Tikal struggled to consistently access clean drinking water. To solve this problem, they created an ingenious water purification system using the minerals quartz and zeolite. It is the oldest of its kind in the Western Hemisphere. The minerals were obtained from a source 18 miles away and brought to the Corriental Reservoir outside the city, where they were used to filter out harmful microbes, heavy metals, and other toxins.



CARIBBEAN: For decades it was believed that the Caribbean islands were settled in a stepping-stone fashion by Amerindians migrating from South America. After reviewing 2,500 radiocarbon dates from 55 islands, researchers are now telling a different story. While Trinidad, the closest island to South America, was the first to be settled, 7,000 years ago, humans didn't simply jump to the next island. Instead, they rode currents north across open sea to Puerto Rico, Cuba, and Hispaniola, before journeying back southward thousands of years later via a chain of smaller islands.



ISRAEL: The abrupt end of the Bronze Age site of Tel Kabri has long puzzled archaeologists.

The Canaanite settlement was one of the most prosperous in the region between 1900 and 1700 B.C., before it was suddenly abandoned. New clues as to what might have happened were recently found during investigation of a 100-foot-long trench that traverses the site. The ditch was originally thought to have been a modern intrusion, but new analysis indicates that it is actually a rupture formed during a massive ancient earthquake that probably left the city irreparably damaged.

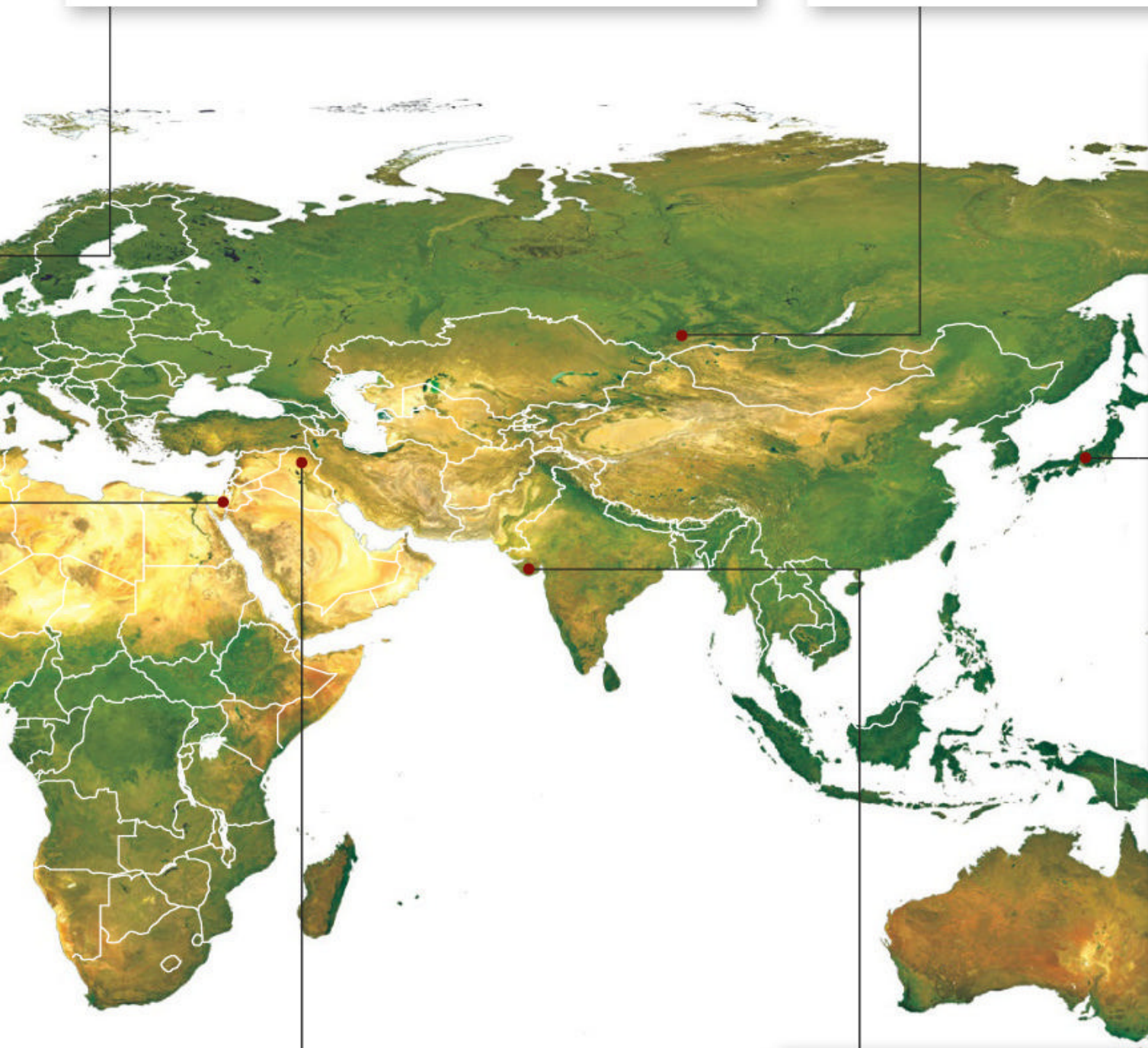


NORWAY: Prior to the construction of a housing development near Ørsta, archaeologists uncovered traces of a Viking-era temple dating to the 8th century. This “god house,” where deities such as Odin, Thor, and Freya were worshipped, is the first of

its kind ever found in Norway, although examples are known from Sweden and Denmark. The building, which originally measured 45 feet long and 40 feet tall including its central tower, would have been the focus of rituals and sacrifices, particularly during the winter and summer solstices.



RUSSIA: The 2,500-year-old tomb of a Scythian warrior couple was uncovered in Siberia’s Khakassia region. The man and woman, who were members of the Tagar culture, were both buried with bronze weapons, including daggers and axes. While long-range arms such as bows and arrows are common in female Tagarian graves, this woman’s assemblage of hand-to-hand combat weapons is unusual and may attest to her fighting prowess. The couple was interred with an elderly woman—perhaps a servant—and an infant.



JAPAN: Infrared cameras have captured hidden Buddhist paintings obscured beneath centuries of soot on columns at the Saimyoji Temple, 40 miles northeast of Kyoto. The images of 8 religious icons, which are impossible to see with the naked eye, can be viewed in detail using the imaging technology. Based on the compositions’ style, researchers believe they may date to the later Asuka period (A.D. 492–710).



IRAQ: A stone pillar bearing an ancient Greek inscription was unearthed in the hills of Iraqi Kurdistan west of the city of Duhok. This territory became part of the Hellenistic world after Alexander the Great defeated the Persian army of Darius III at the nearby Battle of Gaugamela in 331 B.C. The 4-line inscription makes reference to Demetrius I, who reigned over the Seleucid Empire, which ruled the area from 161 to 150 B.C.



INDIA: One of the keys to sustaining the flourishing civilizations of the Indus Valley may have been the development of dairy production. Isotope analysis of lipid residues from ceramic vessels found at the site of Kotada Bhadli indicates that around 2500 B.C., dairy products were common there. This is the earliest such evidence known in India. Milk and cheese from domesticated cattle and water buffalo would have been a major component of the local diet, and any surplus could have been traded with other settlements.

ARCHAEOLOGY magazine's

TOP 10 DISCOVERIES OF 2020*

***AND THE DECADE**





MUMMY CACHE

Saqqara, Egypt

Within three deep burial shafts in a section of the Saqqara necropolis known as the Area of Sacred Animals, archaeologists have unearthed nearly 60 vividly painted wooden coffins containing the mummified remains of individuals who traveled to the afterlife some 2,500 years ago. The sealed sarcophagi were found stacked atop one another alongside 28 statues of the funerary deity Ptah-Sokar-Osiris and a bronze sculpture of the lotus-flower god Nefertum. Although the shafts were reopened multiple times in antiquity to inter more people, researchers have dated all the burials to the 26th Dynasty (688–525 B.C.) based on names inscribed on the coffins. “These kinds of shafts, which contain many burials, possibly for a family or group, were common during this period,” says Mostafa Waziri, secretary-general of Egypt’s Supreme Council of Antiquities. “We think that the owners of these coffins are the priests and high officials of the temple of the cat goddess, Bastet.”

—BENJAMIN LEONARD



Painted sarcophagi



TOP 10 OF THE DECADE

NEANDERTHAL GENOME

VINDIJA CAVE,
CROATIA, 2010

Neanderthals—*Homo sapiens*' closest cousins—went extinct around 30,000 years ago. Yet some people possess genetic markers inherited from these distant relatives. This was the conclusion of a groundbreaking 2010 study led by Svante Pääbo of the Max Planck Institute, whose team successfully sequenced a Neanderthal genome for the first time. Around 400,000 years ago, Neanderthals diverged from the primate line that would go on to produce *Homo sapiens*, and spread to parts of Europe and western Asia.

After modern humans migrated out of Africa, researchers believe they encountered and

interbred with Neanderthals in the Middle East around 60,000 years ago. As a result, modern humans of non-African descent share around 2 percent of their DNA with Neanderthals. Scientists are still learning how these genes manifest themselves. "Neanderthals contributed DNA to present-day people," says Pääbo, "and this has physiological effects today, for example in immune defense, pain sensitivity, risk for miscarriages, and susceptibility to severe outcomes from COVID-19." —Jason Urbanus



CARBON DATING POTTERY

Worldwide

Since the 1990s, biogeochemist Richard Evershed of the University of Bristol has been trying to find a way to accurately radiocarbon date ceramic artifacts. But it has taken nearly three decades for technology to catch up with his vision. Archaeologists have been using pottery styles to date artifacts and sites for decades, but these dates had to be confirmed using methods such as radiocarbon dating of associated materials or dendrochronology, the analysis of tree rings. Evershed's new technique allows researchers to directly radiocarbon date animal fat residue on pottery. His team is able to isolate compounds from samples of pottery that weigh as little as two grams and to detect the minuscule amount of fatty-acid carbon remaining in the residues left by milk, cheese, or meat.

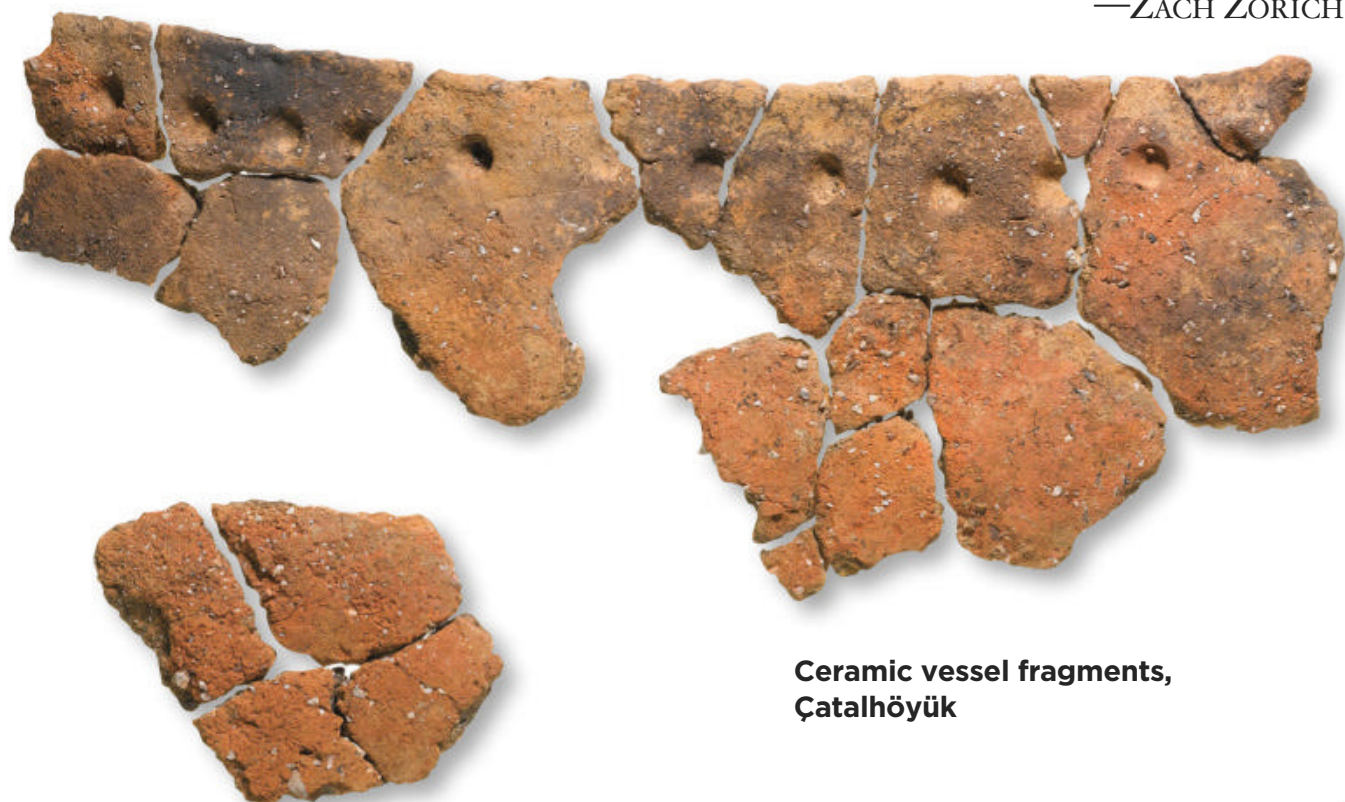
Çatalhöyük excavations, Turkey



Being able to directly date pottery in this way offers archaeologists a novel option. "It gives you a new anchor point," says Evershed. As proof of concept, his team used the method at sites with well-established chronologies. One of these is an elevated wooden path that ran through a wetland in Somerset, England, known as the Sweet Track site. Dendrochronology carried out in the 1980s had

previously revealed that construction of the track began in the winter of 3807 B.C. Dates from pottery found near the track matched the date obtained through dendrochronology. At the early Neolithic (ca. 6700–5650 B.C.) site of Çatalhöyük in Turkey, dates from four pottery sherds also matched the site's known chronology. Evershed hopes the technique will allow researchers to learn more about the origins of animal domestication. It could also reveal when changes in prehistoric diets, such as the adoption of dairy products, took place. The best part, says Evershed, is that pottery is found all over the world and, therefore, "it's a technique that could be applied anywhere, to any culture."

—ZACH ZORICH



Ceramic vessel fragments,
Çatalhöyük



LARGEST VIKING DNA STUDY

Northern Europe and Greenland

The largest-ever study of Viking DNA has revealed a wealth of information, offering new insights into the Vikings' genetic diversity and travel habits. The ambitious research analyzed DNA taken from 442 skeletons discovered at more than 80 Viking sites across northern Europe and Greenland. The genomes were then compared with a genetic database of thousands of present-day individuals to try to ascertain who the Vikings really were and where they ventured. One of the project's primary objectives was to better understand the Viking diaspora, says University of California, Berkeley, geneticist Rasmus Nielsen.

It turns out that the roving bands of raiders and traders, traditionally thought to have come only from Norway, Denmark, and Sweden, were far more genetically diverse than expected. According to Eske Willerslev of the University of Copenhagen, one of the most unexpected results was that the Viking Age of exploration may have actually been driven by outsiders. The researchers found that just prior to the Viking Age and during its height, between A.D. 800 and 1050, genes flowed into Scandinavia from people arriving there from eastern and southern Europe, and even from western Asia. In contrast to the traditional image of the light-haired, light-eyed Viking, the genetic evidence shows that dark hair and eyes were far more common among Scandinavians of the Viking Age than they are today. "Vikings were not restricted to genetically pure Scandinavians," says Willerslev, "but were a diverse group of peoples with diverse ancestry." In fact, some who adopted the trappings of Viking identity were not Scandinavian at all. For example, two individuals who were buried in Scotland's Orkney Islands with Viking grave goods and in traditional Viking style were, surprisingly, determined to be genetically linked to the Picts of Scotland and contemporaneous inhabitants of Ireland.

Viking raiding parties departing from a given country, the study found, tended to journey consistently to a particular destination. Expeditions from Sweden usually went eastward to the Baltic states, Poland, and Ukraine; Vikings from Norway tended to sail to Iceland, Greenland, and Ireland; and those from Denmark predominantly ventured to England. The study also determined that Viking expeditions sometimes comprised a group of close-knit, even related, individuals. Analysis of 41 skeletons from two ship burials in Salme, Estonia, indicates that they likely hailed from a small village in Sweden, and that four were brothers, entombed alongside one another.

—JASON URBANUS



Viking mass grave, England

TOP 10 OF THE DECADE

NEOLITHIC CITY OF SHIMAO

SHAANXI PROVINCE, CHINA, 2011

It was originally thought that the ancient stone walls visible on the edge of the Mu Us Desert in the northern province of Shaanxi had once been part of the Great Wall. But, when archaeologists examined them intensively, they realized something much older and more complex was buried there. They had discovered the lost city of Shimao, which dates back to 2300 B.C. Over the past 10 years, excavators including Zhouyong Sun of the Shaanxi Provincial Institute of Archaeology have uncovered a stone city with immense fortifications and sophisticated infrastructure, thousands of luxurious artifacts, and a 230-foot-high stepped pyramid that served as the residence



for Shimao's rulers and leading families. The site's early date and peripheral location were surprising since Chinese civilization was thought to have first developed in the Central Plains around 500 years after Shimao's founding. "The discovery really puzzled me and other archaeologists," says Sun. "Shimao reveals a unique trajectory to urbanism in China. This once-powerful kingdom was completely unknown in ancient textual records." —J.U.

TOP 10 OF THE DECADE

CHILD AND LLAMA SACRIFICE

HUANCHAQUITO-LAS
LLAMAS, PERU, 2012

A decade ago, archaeologists were summoned to investigate a scattering of human and camelid bones outside the modern city of Trujillo. They would soon learn that the 500-year-old remains belonged to the victims of a mass ritual sacrifice,



the largest of its kind known in the Americas. In total, the skeletons of 200 llamas and 140 boys and girls were recovered from the Chimu site of Huanchaquito-Las Llamas. Cut marks on the children's ribs and sternums suggest their hearts were removed during the ritual before each victim was carefully prepared for burial. "Despite the bloody ceremonies, I was shocked by the careful postmortem treatment of the bodies," says University of Florida archaeologist Gabriel Prieto. "They didn't simply discard them." At first, Prieto thought that the sacrificial event was a singular response to dire climatic changes. However, in recent years, more sacrifice sites spanning hundreds of years have been identified in the region, leading him to conclude that such ceremonies were a central component of the Chimu religion.—J.U.



THE FIRST ENSLAVED AFRICANS IN MEXICO

Mexico City, Mexico

Details from the lives of three young men buried in a sixteenth-century mass grave in Mexico City have finally been brought to light by researchers who conducted isotope, genetic, and osteological analysis of their remains. Most notably, all three appear to have been born in West Africa. The men's teeth were filed into shapes similar to those described by contemporaneous European travelers to West Africa and to dental modifications still performed by some groups in the region today. The skeletons were originally discovered in the 1980s, when subway construction revealed a colonial-era hospital for Indigenous people. "We know there were a large number of Africans who were abducted and transported to New Spain, but they did not generally live in Mexico City," says archaeogeneticist Rodrigo Barquera of the Max Planck Institute for the Science of Human History. "That's why it's surprising to find these three individuals there."

The skeletons also show evidence of strenuous physical labor and violent trauma. According to Barquera, the men were likely among the first generation of enslaved Africans brought to coastal Mexico in the 1520s. They may have toiled on a sugar plantation or in a mine before possibly becoming sick during an epidemic, which could explain their presence at the hospital. Isotope analysis of their teeth—which can determine where a person originated and what kind of food they consumed as a child—was consistent with West African ecosystems, and their DNA revealed that all three shared West African ancestry. However, the men weren't related to each other, and the team couldn't connect them to a specific population. It is possible, Barquera explains, that "after the community in Africa was raided, it disappeared from the historical record."

—MARLEY BROWN

Skulls, Mexico City, Mexico



Dental modification close-ups





LUWIAN ROYAL INSCRIPTION

Türkmen-Karahöyük, Turkey



Inscribed stone



Digital rendering of stone

Türkmen-Karahöyük, Turkey



While conducting a surface survey of the ancient mound site of Türkmen-Karahöyük in southern Turkey, a team led by archaeologists James Osborne and Michele Massa of the University of Chicago made a surprising discovery in a canal not far from the mound: a stone stela bearing hieroglyphs in Luwian, a relative of the Hittite language. Based on the shapes of the glyphs, the inscription has been dated to the eighth century B.C. It records the military achievements of “Great King Hartapu,” a ruler previously known only from inscriptions found at two nearby hilltop sanctuaries. Those enigmatic monuments offer no details about the dates of his reign or the extent of his realm. The new inscription, Osborne explains, establishes Hartapu as a Neo-Hittite leader who claims to have conquered the wealthy kingdom of Phrygia in west-central Anatolia and, in a single year, to have defeated a coalition

of 13 kings. “We now know almost certainly that Hartapu’s capital city was Türkmen-Karahöyük and that he was allegedly powerful enough to defeat Phrygia in battle when it was at its height,” Osborne says. “Hartapu wasn’t a local yokel, he was apparently a major Iron Age player.”

Based on the ceramics they recovered from the mound, the researchers have determined that, by around 1400 B.C., Türkmen-Karahöyük had grown from a small settlement to a regional center sprawling over more than 300 acres. During the succeeding centuries and throughout Hartapu’s reign, Osborne says, the city probably continued to be one of the largest in Anatolia. “Even in a country as archaeologically diverse as Turkey,” he says, “it’s not every day that an archaeologist finds a massive Bronze and Iron Age city that has never been touched.”

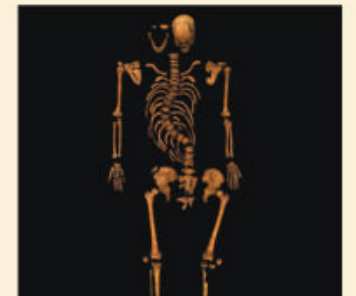
—BENJAMIN LEONARD

TOP 10 OF THE DECADE

THE GRAVE OF RICHARD III

LEICESTER,
ENGLAND, 2012

After Richard III—England’s most vilified monarch—was killed in the Battle of Bosworth in 1485, he was hastily buried in Leicester’s Greyfriars church. When the church was demolished 50 years later by Henry VIII, the grave of the last Plantagenet king was lost. Almost 500 years later, it was identified a few feet beneath a parking lot. “The odds were heavily stacked against us,” says Richard Buckley of the University of Leicester Archaeological Ser-



vices. “What were the chances of the grave surviving for so many years in the middle of a great industrial city?”

Yet, radiocarbon dating and osteological analysis confirmed the bones as Richard’s. The skeleton displayed serious wounds, including blows to the head, consistent with reports of Richard’s battlefield injuries. His severely curved spine, caused by adolescent scoliosis, may have led to exaggerated portrayals of Richard’s physical deformities by his enemies. Subsequent DNA testing even identified at least one living relative, a descendant of his sister Anne.—J.U.

TOP 10 OF THE DECADE

THE WRECKS OF *EREBUS AND TERROR*

ARCTIC CIRCLE,
CANADA, 2014

Captain John Franklin set sail from England in May 1845 with 133 men and two ships—HMS *Erebus* and HMS *Terror*—in search of the Northwest Passage. The crews of two whaling ships that sighted the expedition that August were the



last Europeans to see Franklin and his crew alive, sparking a nearly 170-year maritime mystery. Search parties sent to northern Canada occasionally happened upon ominous clues: items left behind by the expedition, grim testimonies from Inuit witnesses, and even a note left by a crewman on King William Island in 1847 stating that the two ships had become trapped in the ice. In 2014, Canadian authorities announced that researchers had finally located *Erebus* at the bottom of Wilmot and Crampton Bay. Two years later, *Terror* was found around 45 miles away. Both wrecks are remarkably well preserved and, in recent years, underwater archaeologists have explored the ships' cabins and retrieved hundreds of objects, which are helping experts piece together the final days of Franklin's fateful voyage.—J.U.



A SHRINE TO ROMULUS

Rome, Italy

A shrine believed to have once been associated with Romulus, the mythical founder of Rome, has reemerged in an ancient and sacred part of the Roman Forum. The small monument was first discovered by archaeologist Giacomo Boni in 1899, but was subsequently reburied and forgotten for more than a century. During renovation work on the stairs of the Curia Julia, the ancient Roman Senate house, workers rediscovered the sixth-century B.C. hypogeum, or subterranean tomb, which contains a stone

sarcophagus and a small round altar.

According to legend, Romulus and his brother, Remus, were abandoned at birth and then rescued and nurtured by a she-wolf. Tradition holds that Romulus went on to found the city of Rome in 753 B.C. The recent archaeological rediscovery was made in an area of the Forum where the fabled forefather's tomb was once located, according to some Roman writers. It is also near a very ancient and mysterious rectangle of black paving stones, known as the Lapis

Laser scan showing location of Romulus shrine, Forum, Rome, Italy



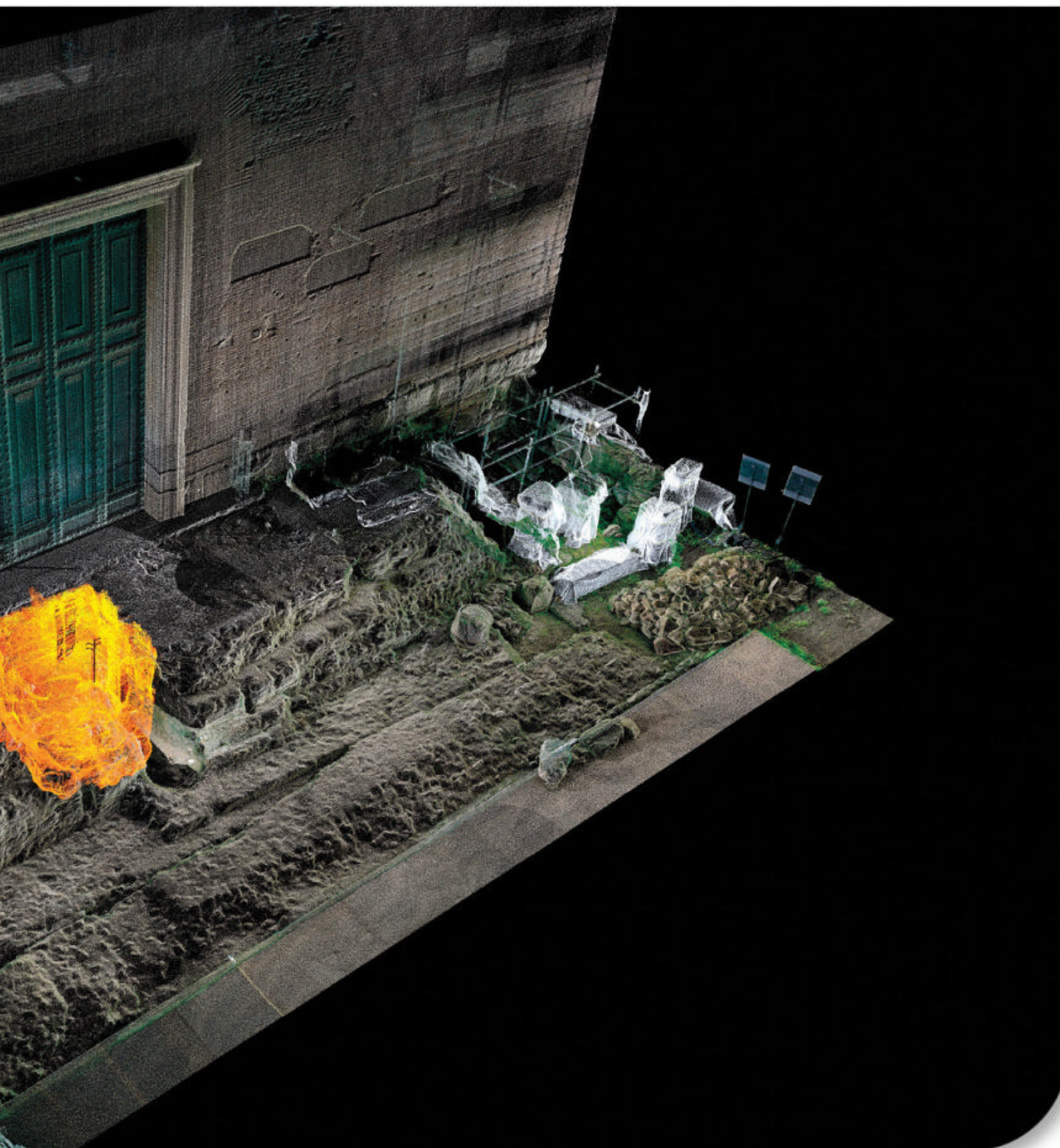
Niger, that Romans believed marked the spot where Romulus was murdered by members of the Senate.

Scholars still debate whether Romulus actually existed, and, in any case, archaeologists do not believe the shrine ever held his body. Instead, suggests Alfonsina Russo, director of the Archaeological Park of the Colosseum, it was created as a symbolic monument where Romans could worship their city's legendary founder and celebrate Rome's origins.

—JASON URBANUS



Romulus shrine



TOP 10 OF THE DECADE

HOMO NALEDI

RISING STAR CAVE,
SOUTH AFRICA, 2015

When the strange skeletal remains of more than a dozen early hominins were uncovered in South Africa's Rising Star cave system, they challenged the story of human origins. The fossils perplexed scholars, as their anatomical features combined modern human and ape-like characteristics. Their shoulders and curved fingers were adapted to climbing trees, but their long, slender legs and foot shape suggested that these hominins walked on two feet. Their skulls were similar to those of modern humans, but their brain cavities were less than half the size. University of Witwatersrand paleoanthropologist Lee Berger and colleagues determined that the bones represent a previously unknown human species, now called *Homo naledi*. Recent dating of the bones indicates that *Homo naledi* lived around 230,000 to 330,000 years ago, almost a million and a half years later than initial estimates. This means that the species was not only a distant cousin of modern humans, but also a neighbor living at the same time. "It's remarkable," says Berger. "Until *naledi*, we thought modern humans were alone in Africa at this time." —J.U.



TOP 10 OF THE DECADE

LASER SCANNING

ANGKOR, CAMBODIA,
2015

The countryside surrounding the Khmer Empire's capital of Angkor is blanketed with thick jungle, which has hindered archaeological investigation for more than a century. However, laser scan-



ning technology was finally able to do what researchers couldn't and peer through the dense vegetation, revealing unknown urban settlements and hundreds of hidden archaeological features. "Had you been there a thousand years ago, the forest wouldn't have existed," says Damian Evans of the French School of Asian Studies. "You would have seen a vast, bustling metropolis of wooden dwellings and fields stretching off in every direction." The 3-D images captured in 2015 were the result of the most extensive archaeological scanning project ever undertaken. Evans' team surveyed 737 square miles of terrain at the heart of the Khmer Empire, which flourished between the ninth and fifteenth centuries. The images captured a complex system of roads, canals, and dams that attest to the civilization's scale, sophistication, and remarkable ability to engineer Cambodia's challenging landscape.

—J.U.



OLDEST CHINESE ARTWORK

Henan, China

A tiny 13,500-year-old sculpture crafted from burned bone discovered at the open-air Lingjing site can now lay claim to being the earliest three-dimensional object of art found in East Asia. But what makes something a work of art or someone an artist? "This depends on the concept of art we embrace," says archaeologist Francesco d'Errico of the University of Bordeaux. "If a carved object can be perceived as beautiful or recognized as the product of high-quality craftsmanship, then the person who produced the figurine should be seen as an accomplished artist." Measuring only half an inch high, three-quarters of an inch long, and just two-tenths of an inch thick, the bird, a member of the order Passeriformes, or songbirds, was made using six different carving techniques. "We were surprised by how the artist chose the right technique to carve each part and the way in which he or she combined them to achieve their desired goal," says d'Errico. "This clearly shows repeated observation and long-term apprenticeship with a senior craftsperson." The artist's attention to detail was so fine, adds d'Errico, that after finding that the bird was not standing properly, he or she very slightly planed the pedestal to ensure the avian would remain upright.

—JARRETT A. LOBELL

Six views of the bird sculpture,
Lingjing, Henan, China



3-D renderings of the carving



ENDURING RITES OF THE MOUND BUILDERS

Georgia, United States

Aerial view, 1978, Dyar Mound, Georgia, United States



The site of a three-story-high earthen structure known as Dyar Mound now lies beneath central Georgia's Lake Oconee, a reservoir created by a dam built in the 1970s. Before the dam's construction, archaeologists excavated the mound, which was originally built in the fourteenth century A.D. by the ancestors of today's Muscogee Creek people. Based on artifacts recovered from the site, they determined that Dyar Mound had been abandoned shortly after a 1539–1543 expedition led by Spanish explorer Hernando de Soto traversed the southeastern United States. De Soto and his retinue brought diseases that caused a population collapse in the region. This collapse has long been thought to have precipitated the sudden end of the Mississippian tradition, a widespread



Mississippian shell ornament

belief system practiced by the ancestral Muscogee peoples, among others.

A team led by Washington University in St. Louis archaeologist Jacob Holland-Lulewicz has now redated charcoal unearthed at Dyar Mound and used statistical modeling to determine that the site was not in fact abandoned after the de Soto expedition, but that people carried out Mississippian rites atop the mound for nearly 150 years more. “The ancestors of the Muscogee were resilient, and their practices endured for generations,” says Holland-Lulewicz, who notes that advances in radiocarbon dating methods will likely continue to help revise scholarly narratives of early contact between Europeans and Indigenous peoples.

—ERIC A. POWELL

TOP 10 OF THE DECADE

GRAVE OF THE “GRIFFIN WARRIOR”

PYLOS, GREECE, 2015

One of the greatest archaeological discoveries in Greece over the past 50 years was made at Pylos by University of Cincinnati archaeologists Jack Davis and Sharon Stocker. The grave of the “Griffin Warrior” held the remains of a powerful man who died around 1450 B.C. and was buried alongside 1,500 precious objects, including silver cups, bronze weapons, ivory combs, and gold rings. “The more we study the assemblage, the more amazed we are by how rare and ex-



otic this unique group of artifacts is,” say Davis and Stocker. The most exquisite artifact is one of the smallest: a 1.4-inch-long carved almond-shaped agate sealstone depicting three warriors. Davis and Stocker believe the gem was made on Crete. “Our understanding of the closeness of the relationship between Pylos and the Minoans of Crete has grown,” they say. “As we look more closely at certain artifacts, particularly the sealstones, we realize that they were likely produced by Minoan craftsmen and display typical Minoan iconography. Other artifacts in the grave, however, are very mainland in their appearance.”—J.U.

TOP 10 OF THE DECADE

MUMMIFICATION WORKSHOP

SAQQARA, EGYPT, 2018

Mummification is among the best-known religious practices of the ancient Egyptians, yet apart from a few textual descriptions and tomb paintings, very little is known about the facilities where this process took place. That changed when archaeologists discovered a unique series of rooms dating to the Saite-Persian period of the mid-first millennium B.C. “The whole complex could be looked upon as a funeral home of sorts that provided the service of mummification along with burial compartments and equipment,” says Ramadan Hussein of the University of Tübingen. The facility includes a subterranean chamber at the bottom of a 40-foot-deep shaft that was used by embalmers. There, they laid



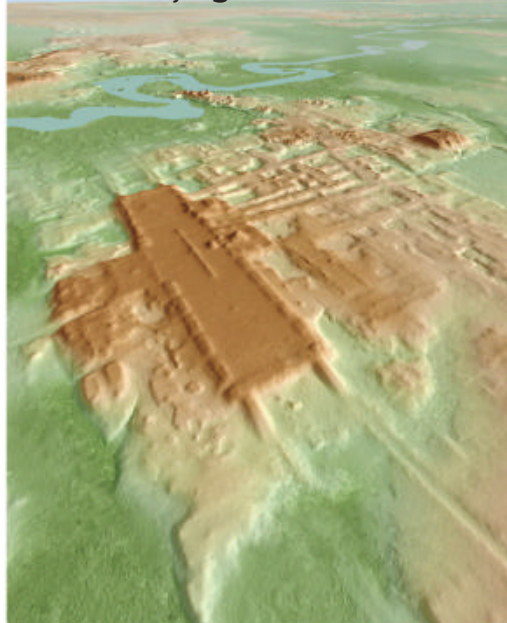
bodies out on a rock-cut bed, drained them of fluids, and prepared them for burial. Hussein’s team also found ceramic vessels labeled with substances’ names and instructions for how each should be used in the mummification process. Just feet from the embalmer’s room, the team located a 100-foot-deep shaft that contained six different tombs holding 59 mummies.—J.U.



OLDEST MAYA TEMPLE

Tabasco, Mexico

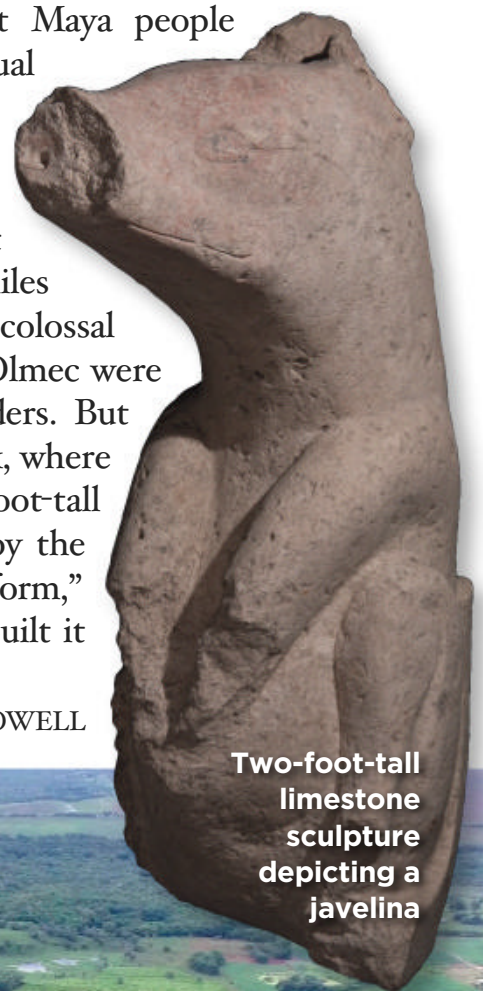
Lidar scan, Aguada Fenix



The oldest and largest ceremonial structure in the Maya world has been hiding in plain sight on a Mexican cattle ranch near the Guatemala border. “It just looks like part of the natural landscape,” says University of Arizona archaeologist Takeshi Inomata. He and his team were studying low-resolution lidar images of the region collected by the Mexican government when they were astonished to come across what seemed to be a huge earthen platform. A subsequent high-resolution lidar survey of the site showed that the platform stretches almost a mile long and rises as high as 50 feet. Radiocarbon dating suggests that Maya people constructed the ritual space between 1000 and 800 B.C.

Known as Aguada Fenix, or “Phoenix Reservoir,” the structure resembles a platform discovered in the 1960s at the even older Olmec city of San Lorenzo, some 300 miles to the west. Evidence unearthed at San Lorenzo, such as colossal stone heads memorializing its rulers, suggests that the Olmec were likely directed to build the platform by powerful leaders. But signs of such social inequality are absent at Aguada Fenix, where the only piece of sculpture thus far unearthed is a two-foot-tall limestone sculpture of a javelina nicknamed “Choco” by the excavators. “People weren’t coerced into building this platform,” says Inomata. “They seem to have come together and built it communally, without strong central leadership.”

—ERIC A. POWELL



Two-foot-tall
limestone
sculpture
depicting a
javelina

Aerial view, Aguada Fenix, Tabasco, Mexico





FIRST ENGLISH PLAYHOUSE

London, England



Red Lion stage, London, England

Archaeologists have uncovered what they believe are the remains of the Red Lion, the earliest purpose-built playhouse in England, which dates to the 1560s. Prior to this, playhouses were temporary creations, generally set up in the yards of inns or within great houses. The Red Lion was built under the direction of a grocer named John Brayne and until its discovery was known primarily from a pair of lawsuits he filed alleging shoddy workmanship by the carpenters who helped construct it. The later lawsuit, filed in 1569, mentions “a farme house called and known by the name of the Sygne of the Redd Lyon” that has seating and a stage measuring 40 feet north to south and 30 feet east to west.

Guided in part by land deeds that placed the Red Lion on the border of Whitechapel and Stepney Parishes in East London, a team from University College London’s Archaeology South-East unearthed a timber structure closely matching the dimensions noted in the

lawsuit. The team also discovered a number of postholes, which they have dated to the mid-sixteenth century, surrounding the stage. The posts may have supported scaffolding or galleried seating. “Some had assumed that the Red Lion would be round or octagonal,” says lead archaeologist Stephen White. “But it actually looks very reminiscent of certain European theaters that were operating in the sixteenth century where you have these types of enclosed rectangular spaces.”

The Red Lion doesn’t appear to have enjoyed a very lengthy career as a playhouse, but it does seem to have served as a prototype for The Theatre in Shoreditch. Larger than the Red Lion, The Theatre was built by Brayne in 1576 in partnership with his brother-in-law, the actor and theatrical impresario James Burbage, and premiered a number of William Shakespeare’s early works. Burbage’s son Richard was a close friend of Shakespeare and played the lead role in many of his plays.

—DANIEL WEISS

TOP 10 OF THE DECADE

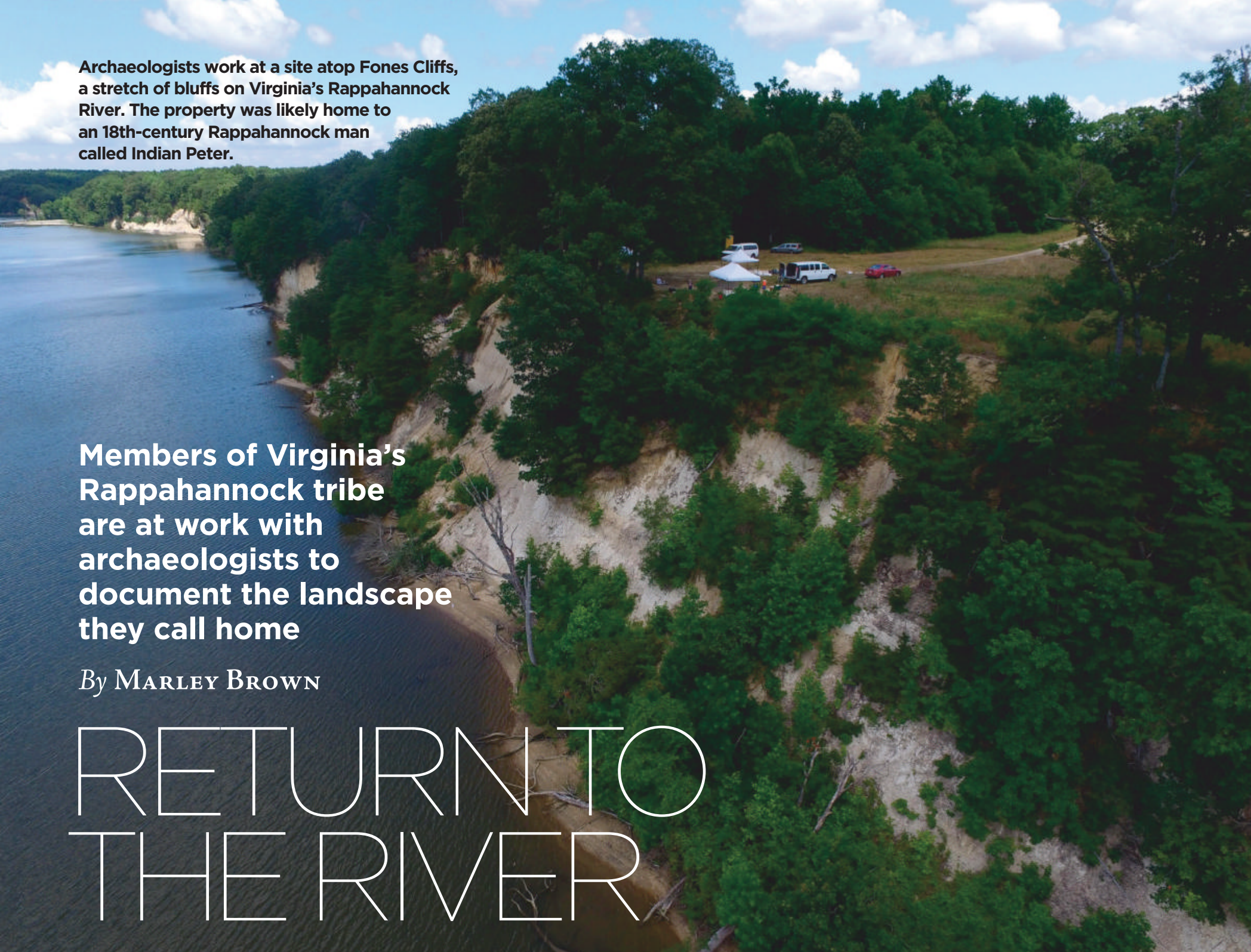
REGIO V EXCAVATIONS

POMPEII, ITALY, 2018

Although Pompeii has been almost constantly excavated since the mid-eighteenth century, around one-third of the city still remains buried beneath 20 feet of volcanic debris from the A.D. 79 eruption of Mount Vesuvius. Archaeologists do not often get a chance to work in the unexcavated areas. However, when



a large section of volcanic debris in a neighborhood known as Regio V began to collapse, authorities had no choice but to remove more than a quarter acre of material, revealing long-hidden parts of the Roman city. Streets, houses, and workshops were exposed for the first time in almost 2,000 years. Vibrantly colored frescoes, still bright and radiant, look as if they have just been painted. Archaeologists also retrieved a number of bodies of people who were not fortunate enough to escape the deadly eruption, including 11 found huddled together in one room of a newly explored house. Excavations continue...—J.U.



Archaeologists work at a site atop Fones Cliffs, a stretch of bluffs on Virginia's Rappahannock River. The property was likely home to an 18th-century Rappahannock man called Indian Peter.

Members of Virginia's Rappahannock tribe are at work with archaeologists to document the landscape they call home

By MARLEY BROWN

RETURN TO THE RIVER

SOON AFTER CAPTAIN JOHN SMITH arrived at Jamestown in 1607, or so the story goes, he was captured by Opechancanough, the brother of the powerful Native chief Powhatan. English explorers wrote that Powhatan controlled a domain spanning much of what is now Virginia, from the state's Piedmont region to the coast. Several tribes reportedly paid him tribute and lived within his Powhatan Confederacy. After Smith narrowly escaped execution through, he later claimed, the intervention of Powhatan's daughter Pocahontas, he set off from Jamestown to explore and chart the Chesapeake Bay and its tributaries. Opechancanough had already taken Smith to a number of Native settlements during his captivity, including at least one on the Rappahannock River. Smith recorded that the Rappahannock peoples, who inhabited both sides of the eponymous waterway, were divided among eight communities, each with a leader, or werowance. Smith mapped or described 43 of their villages, reporting friendly encounters with some groups and hostility from others.

More than 400 years later, the Rappahannock still call Virginia home. The community numbers some 300 enrolled members, many of whom live in Indian Neck, a hamlet about

10 miles west of the modern town of Tappahannock. Since 2016, tribal members have been working with archaeologists to document their traditional homeland, a task that has presented challenges. Centuries of European encroachment and the conversion of woodland to farmland have physically separated the Rappahannock from many of their ancestral landmarks. Their towns, hunting camps, and ceremonial grounds were often built from ephemeral materials and were sometimes relocated for environmental or political reasons. Led by Chief Anne Richardson of the Rappahannock Tribe and archaeologists Julia King and Scott Strickland of St. Mary's College of Maryland, the project was launched as an initiative of the National Park Service to identify sites within a 552-square-mile swath of territory that are culturally significant to the tribe.

Using a combination of excavation, geographic information system (GIS) technology, historical research, and interviews with Rappahannock community members, the researchers have revealed a Native landscape that has long been hidden. Smith may not have mapped the Chesapeake completely accurately, says King. Some Native place-names are repeated on the Smith map, and some are found in multiple locations around the Chesapeake. Native settlements rarely accorded

with European expectations for what a town or village should be. Still, by combining the present-day community's knowledge with the map Smith made in 1608, satellite imagery, and environmental data from the area, the team has identified some 20 places of significance to the tribe and an approximate location for nearly all the settlements Smith labeled. Some of these are large towns whose whereabouts the tribe has, in fact, never forgotten. "I had been taking our youth back to places that our people occupied on the river to teach them about the history as part of a leadership training program," says Richardson. "When the opportunity was presented to do archaeology to actually prove where these places were, I jumped all over that."

THREE OF THESE LARGER settlements, Wecuppom, Matchopick, and Pissacoack, are recorded on the Smith map to have sat atop Fones Cliffs, a four-mile stretch of sandstone bluffs on the Rappahannock's north bank. Smith describes coming under arrow fire near a marsh across the river from these cliffs as he and his companions made

their way up the river. While excavations and surveys along a section of the cliffs that is now a federal wildlife preserve didn't produce evidence of any of the settlements, the team did uncover artifacts that suggest the area remained home to Rappahannock people for decades after pressure from English settlers forced them to move their main settlements elsewhere. In particular, the team believes that, during excavations on a 250-acre parcel of land within the preserve, they uncovered a property described in historic deeds as home to a once-enslaved Native man named Indian Peter.

Indian Peter is recorded to have been manumitted in 1699—about 50 years after English colonists began moving into the area—and may have lived at the site between 1700 and 1730. Richardson says that some of the artifacts the team found, including worked quartz crystals and a wineglass stem carved to resemble crystal, may have been used by Peter in a medicine man-like capacity, or during cliff-top religious ceremonies that were held overlooking the river some 80 feet below. In addition to the wineglass stem, English and German



A 1622 map of Virginia based on Captain John Smith's 1608 map of the Chesapeake Bay shows (circled) the Rappahannock River and many of the sites Smith visited.

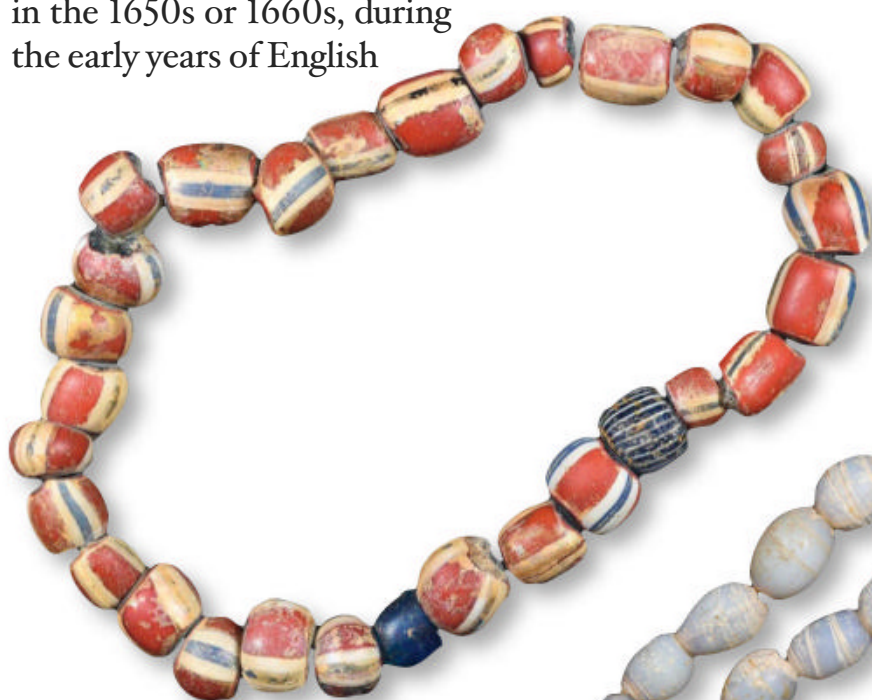


ceramics, a copper buckle, tobacco pipes, a collection of nails, and other objects of European origin are evidence of the flow of goods and people up and down the Rappahannock throughout the colonial period.

King points out that Portobago Bay, some 10 miles upriver from Fones Cliffs, was the point at which the river became

unnavigable for oceangoing vessels. “Portobago Bay became a natural provisioning area,” King says, “and an important place that linked the trade routes of the Atlantic with the interior.” Archival research also uncovered the identity of a Christianized member of a Rappahannock-affiliated group called the Nanzatico, who lived nearby. Edward Gunstocker, or Indian Ned, may have been so named because he was involved in smithing or trading guns. “One of the property divisions outlined in a document mentions his house,” says Strickland. Using this information, Strickland was able to approximate the structure’s location, and the team hopes to excavate the site in the future.

KING AND STRICKLAND HAVE also gone back to look at previously recovered artifacts, many of which were found decades ago by property owners on sites that have never been systematically excavated. One of these, called Leedstown, is located on the river between Fones Cliffs and Portobago Bay, and was once home to the Rappahannock town of Pissaseck. A cache of cut-crystal and glass beads of European origin was discovered there in the early twentieth century along a pathway to the river’s edge. The cache was first created in the 1650s or 1660s, during the early years of English



European glass beads were discovered in a cache at the site of Leedstown on the Rappahannock River. Similar examples have been found at Native sites up and down the East Coast.

settlement in the area. It appears to have been supplemented at least twice. The first set of additional materials was deposited some 20 years later, likely following Bacon’s Rebellion, a popular uprising against the Virginia governor asserting the rights of settlers to expand their territory. These offerings may have been stashed by Native Americans to secure spiritual protection in the face of increasing hostility from and violence committed by Europeans. The second addition came in the mid-eighteenth century.

During recent excavations at Leedstown, the team uncovered Indigenous ceramics, including fragments of Potomac Creek Ware and Townsend Ware, as well as more beads, which appear to have been scattered around the site by farming activity. King and Strickland say that the striped beads in the cache, and similar examples, were probably made in Italy. They are found almost exclusively at contemporaneous Native sites ranging from Pennsylvania to Florida. According to King, their distribution at Native sites beyond Leedstown suggests that the network of trade in animal skins, enslaved Indians, and guns that began in Virginia in the seventeenth century had expanded to cover much of the eastern seaboard by the turn of the eighteenth.

In an example of the duplicate place-names recorded by Smith on his 1608 map, there are two sites called Cuttatawomen. One lies at the mouth of the river and the other just west of the modern town of Port Royal, some 60 miles upstream. Strickland says that the relationship between the two towns was a mystery until he thought about differences in the ceramics that have been found at various sites along the river. “You can almost make a plot of ceramic types by type of temper along the river,” he says. Temper refers to material mixed with clay to prevent shrinkage and cracking when ceramic vessels are fired. Upstream, he explains, it’s more common to find ceramics made with a tempering method using crushed quartz, while farther downstream it is more common to find ceramics that have been tempered with ground shells. “At one particular site identified with the upriver Cuttatawomen, we examined an assemblage of nearly all shell-tempered ceramics,” says Strickland. He believes that the people who settled the Cuttatawomen site at the mouth of the river may have traveled upriver and brought their ceramic traditions with them. “Whether it’s a colony or an important ceremonial place, we identified some really interesting ceramics that were highly decorated and unusual,” he says.



Evidence that the Rappahannock traveled across the landscape doesn’t surprise archaeologist Martin Gallivan of the College of William and Mary, who has excavated a number of pre- and post-contact Native sites in the Chesapeake, including Chief Powhatan’s capital at Werowocomoco on the York River. “The John Smith map is a great

resource,” Gallivan says, “but it does apply a fixity and boundedness to these Native societies that doesn’t line up with the evidence on the ground.” In his own projects, Gallivan has discovered evidence that Native communities in the region were connected through exchange networks across the Chesapeake and north to New England, south to the Gulf of Mexico, and west of the Blue Ridge Mountains. “People were on the move, they were travelers, and they visited other communities,” he says. “They had broad geographic knowledge and they could draw accurate maps covering hundreds and hundreds of miles.”

Perhaps because of the density of Native settlement in the Rappahannock River Valley, colonial authorities forbade settlers from moving into the region until the 1650s. This led to the area’s becoming a refuge for Native communities from as far afield as North Carolina whose lands had already been seized. It was at this point, according to Richardson, that the identity of the modern Rappahannock Tribe began to take shape, particularly after the Nanzatico were nearly all captured by the English and sold into slavery in the Caribbean in retribution after a band of their warriors was accused of killing the members of a white settler family. “We became the dominant tribe on the river and took in the various peoples who had been dispossessed of their land,” Richardson says. “I think that it’s very important to note that scholars who have looked at the Indigenous history of Virginia describe a great empire under Powhatan, but our leadership was really structured around taking care of and sharing the land.”

THE NATURE OF THE Rappahannock’s relationship to Powhatan and his dominion has been the source of debate for at least a century. Smith mentions no antagonism between the Rappahannock and the Powhatan Confederacy. Richardson points out that the powerful chief’s own brother took Smith to a Rappahannock town—possibly because Smith was suspected of having killed the community’s leader. This act, she says, suggests a relationship of relative mutual respect between the peoples. Still, one curious element of Smith’s map has stood out to scholars; namely, that nearly all the Rappahannock settlements included on it lie on the river’s north bank.

Before conducting their excavations, the team developed a GIS model to find locations with environmental attributes favorable for establishing Native settlements. These included rich soil, a nearby source of freshwater, transportation waterways and landing places for canoes, habitats for aquatic and terrestrial animals, and good visibility across the landscape. The GIS model, which is based in large part on publicly available environmental data, shows that such locations are found closer to each other and in greater number on the north side of the river. “Smith shows all of these villages on the north side of the river, and for a long time that was interpreted as a physical means that the tribes in the Rappahannock River Valley were using to distance themselves from Powhatan,” says



Indigenous ceramics, including examples of Potomac Creek Ware (top and above left) and Townsend Ware (top and above right) were also discovered in Leedstown.

King. “But what we found from GIS modeling is that there are very different environmental conditions on the north side of the river versus the south side, so there might have been more of an economic reason for choosing the north.”

The model also helped establish a viewshed, the geographical area visible from any given location. “There are a number of ossuary sites along the Rappahannock, important monuments composed of human remains,” King explains. “We’ve found that

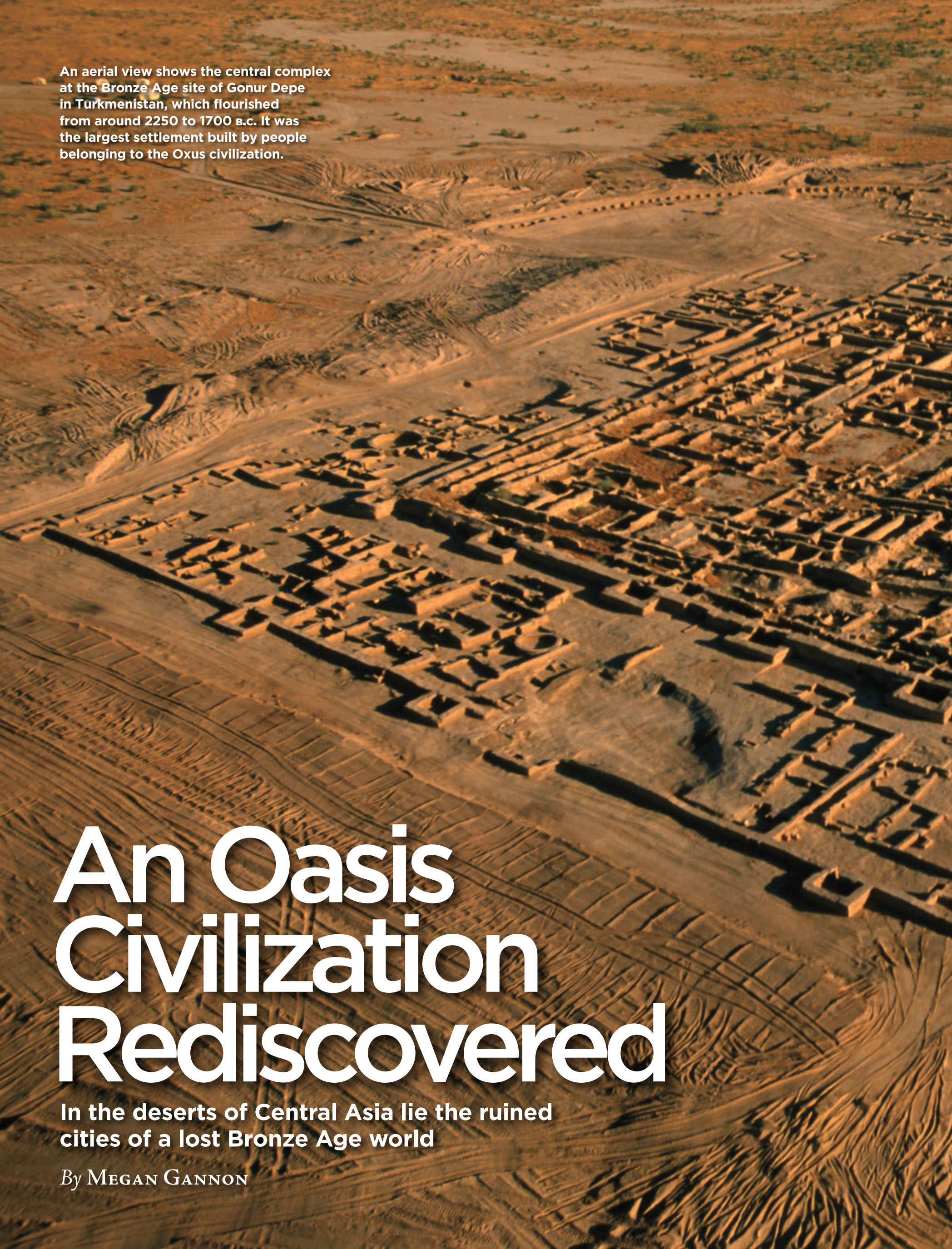


The base of what was probably a wineglass found at Fones Cliffs was carved to resemble quartz crystal and may have been used in religious ceremonies.

known Rappahannock settlement sites are often within that viewshed, within the direct line of sight of these ossuaries.”

The researchers determined that there was also a seasonal dimension to the location of settlements. “We followed the resources we could gather as the seasons changed on the river,” says Richardson. “In the summer, we were primarily on the northern riverbanks, catching fish and growing corn where the soil is so rich.” In the winter months, the community would move to the south bank of the river to hunt, often engaging in communal hunts with neighboring groups. While her tribe has been deprived of many of its ancestral spaces, Richardson sees continuity between the past and current movement of her people around the landscape. The combination of memory and research will provide a connection back to the river. “Rappahannock means a place where the water rises and falls,” she explains. “We have been a cyclical people that have risen and fallen at certain times in history. When we left the riverbanks, we went inland into our hunting grounds, and eventually we returned to the river again.” ■

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An aerial view shows the central complex at the Bronze Age site of Gonur Depe in Turkmenistan, which flourished from around 2250 to 1700 B.C. It was the largest settlement built by people belonging to the Oxus civilization.

An Oasis Civilization Rediscovered

In the deserts of Central Asia lie the ruined cities of a lost Bronze Age world

By MEGAN GANNON



FOR SOME 3,500 YEARS, the sand dunes of Turkmenistan's Murghab Delta plains, a stretch of Central Asia's Karakum Desert, concealed the ruins of a sprawling 70-acre city belonging to a long-forgotten civilization, its name lost to history. First rediscovered by Soviet archaeologists in the 1970s, the city was dubbed Gonur Depe, or "Gray Hill," which is what the local Turkmen called the site. The sandy mound concealed high mudbrick walls, carefully gridded streets that divided residential districts from those where merchants may have plied their trades, and areas where religious ceremonies likely took place. Soon after the city's discovery, excavations revealed that the people of Gonur Depe were immensely wealthy. Artisans crafted beads from lapis lazuli imported from Afghanistan, carved ivory from India



oasis city were devoid of minerals or other commodities. "They didn't really have any raw materials whatsoever to offer," says Nikolaus Boroffka, an archaeologist at the German Archaeological Institute (DAI). "What they did have to offer was water and food." Many centuries before the Silk Road wound through this region, he explains, Gonur Depe's wealth likely came in part from provisioning camel caravans passing through the city.

An array of imported artifacts, including a Mesopotamian cylinder seal and a stamp from the Indus Valley depicting an elephant, have been unearthed at Gonur Depe. Such objects, along with the discovery of Oxus artifacts outside Central Asia, suggest to archaeologists that, beginning around 2200 B.C., the Oxus people established commercial and diplomatic partnerships that stretched from Anatolia and Syria to the



Four ivory mosaic inlays (above) depicting dragon heads and a portrait inlay (right) were unearthed in Gonur Depe's high-status necropolis.

into mosaics depicting dragon-like creatures, and fashioned lavish depictions of goddesses from silver mined by nomads.

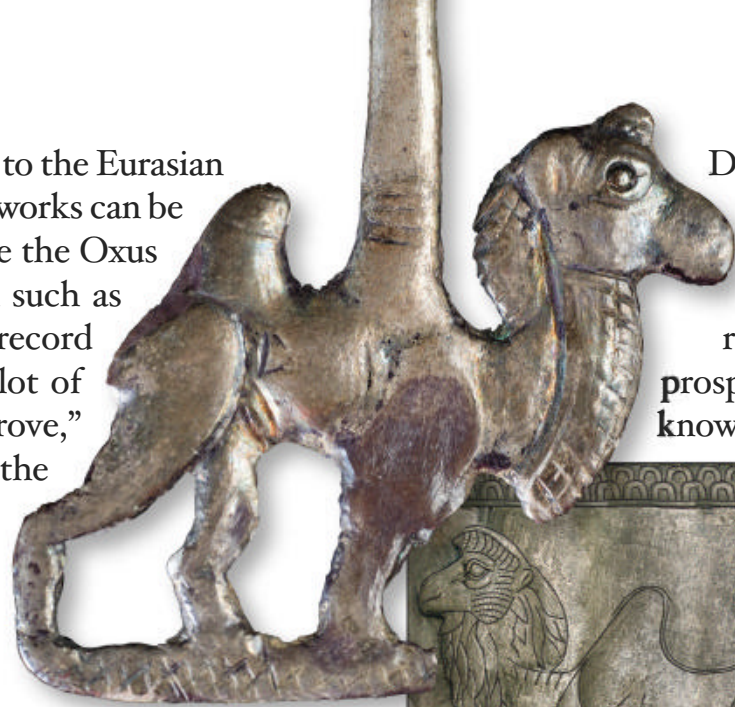
Archaeologists digging at Gonur Depe, now led by Russian Academy of Sciences anthropologist Nadezhda Dubova, have established that the city flourished from about 2250 to 1700 B.C., during the Bronze Age, and that the people who lived there belonged to what scholars now call the Oxus civilization. This widespread culture shared pottery styles, architectural forms, burial customs, and a unique artistic vision. Its members spread across a broad swath of southern Central Asia, including parts of Iran, Turkmenistan, Uzbekistan, Tajikistan, and Afghanistan. Gonur Depe is the largest of the 150 known Oxus settlements of varying sizes, clustered around the oases of the Murghab Delta. Its people obtained their rich array of goods through trade, despite the fact that the desert plains surrounding this



Indus Valley and from the Persian Gulf to the Eurasian steppe. The precise nature of these networks can be difficult to reconstruct, largely because the Oxus people did not have a writing system such as the one that Mesopotamians used to record economic transactions. “Texts give a lot of information that is very difficult to prove,” says archaeologist Bertille Lyonnet of the French National Center for Scientific Research. As an example, she notes that Mesopotamian cuneiform tablets record extensive trade in metal with the Indus Valley, but the raw materials themselves, such as ingots of tin and copper, do not survive. Some commodities the Oxus people may have traded, such as textiles or horses, have left no trace in the archaeological record. But the artifacts that do remain suggest the caravans passing through Gonur Depe carried a large volume of goods.

This trade network eventually faltered, and beginning around 1700 B.C., the Oxus people started to abandon their large oasis settlements. The shifting sand dunes eventually buried the prodigious mudbrick walls of cities such as Gonur

A view of the mudbrick fortifications surrounding Gonur Depe’s central complex



A silver pin (top) and a relief (above) on a vessel found at Gonur Depe both depict camels, which were vital to the trade caravans that passed through the city.

India, and Iran, has given archaeologists a look at a truly unknown civilization. Understanding why this once-vibrant culture came to an end and how its people transformed their way of life could change how scholars perceive the trajectories of ancient cultures all across the Bronze Age world.

ALTHOUGH CENTRAL ASIA was a natural crossroads between the ancient civilizations of East Asia, South Asia, and the Near East, the region was, for a long time, a blank space on archaeologists’ maps of the Bronze Age. During the early twentieth century, in the foothills of the Kopet Dag Mountains that separate Iran and Turkmenistan, archaeologists discovered Neolithic villages dating back to 4500 B.C. But the desert farther east was not thought to have major ruins. Then, in the late 1960s, Soviet archaeologists began to find the remains of walled sites that would later be identified as belonging to the Oxus civilization. In 1974, archaeologist Viktor Sarianidi began the first extensive excavations of Gonur Depe. Sarianidi initially called the newly discovered culture the “Bactria-Margiana Archaeological Complex,” or BMAC, based on names for the region recorded in Persian and Greco-Roman written sources. Later, scholars named it the Oxus civilization after the ancient Oxus River, now called the Amu Darya, which flows through part of this vast territory.

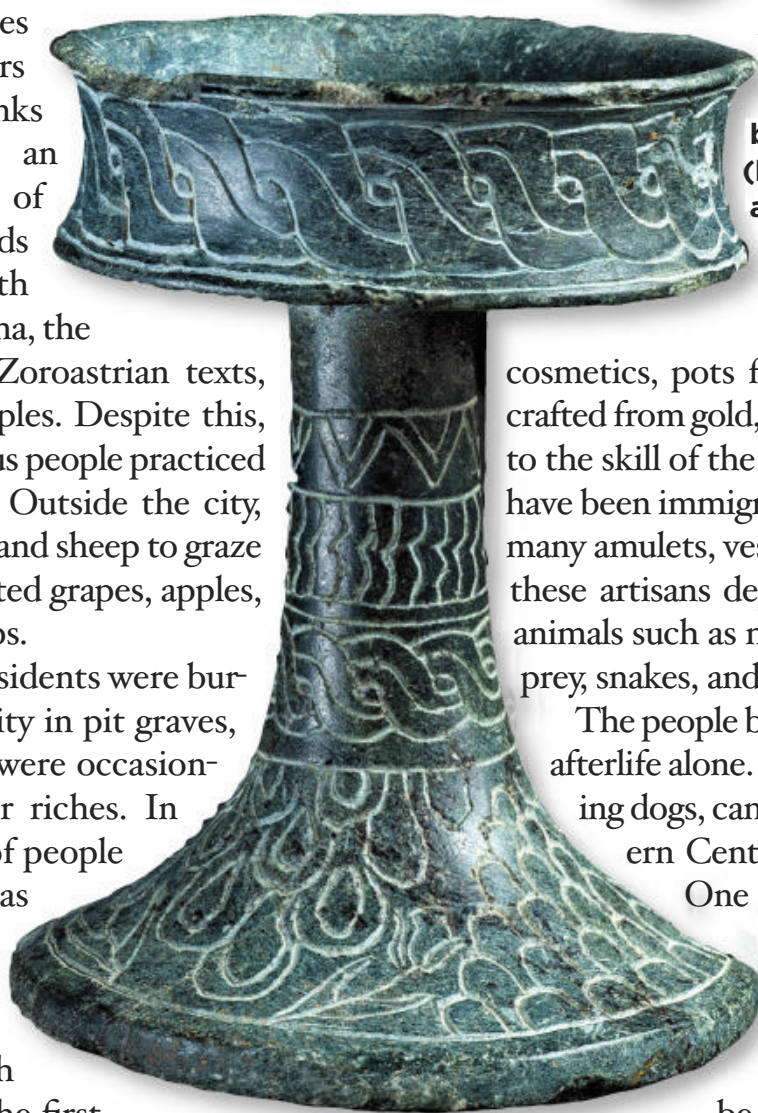
Through many seasons, Sarianidi and his team worked to remove the enormous mound that concealed Gonur Depe. Once the earth had been cleared, square fortifications emerged, enclosing what Sarianidi interpreted as a large central palace complex covering about four acres that had pools with purification systems arranged in front of each of its four gates. Entrants to this religious and administrative core may have stopped at the gates to ritually wash themselves. Sarianidi imagined that



fire altars perpetually burned at temples in the complex and that worshippers may have imbibed hallucinogenic drinks during ceremonies that resembled an early form of Zoroastrianism, one of the world's oldest faiths. Hemp seeds and pollen from ephedra, a plant with stimulant properties used to make soma, the hallucinogenic drink mentioned in Zoroastrian texts, have been found in jars in Oxus temples. Despite this, many scholars now doubt that the Oxus people practiced a religion related to Zoroastrianism. Outside the city, herders bred cattle and brought goats and sheep to graze in river meadows, and farmers cultivated grapes, apples, cherries, barley, wheat, and other crops.

Most of Gonur Depe's ordinary residents were buried at a main cemetery west of the city in pit graves, shaft tombs, and shared crypts, and were occasionally adorned with jewelry and other riches. In Gonur Depe's later years, hundreds of people were also interred in the city center as it started crumbling into ruins. At Gonur Depe's height, around 2000 B.C., the city's elite were buried in a necropolis southeast of the city, which the team first discovered in 2004. The first tomb they unearthed contained a wagon whose four large wheels were outfitted with metal tires. They would go on to uncover several elaborate burial chambers called hypogea that were laid out like underground houses. Some had courtyards and were decorated with intricate ivory mosaics in geometric patterns, including one that resembles stylized hearts. Many of the graves had already been pilfered in antiquity. The looting holes were often so well placed, corresponding to the exact location of the richest part of the burials, that Sarianidi and his colleagues suspected that funeral attendees likely took part in the looting. However, the looters left behind enough grave goods to leave little doubt that the necropolis held the remains of the city's wealthiest residents.

These high-status people were laid to rest along with everything they needed to take with them to the afterlife: jewelry,



A seal (far left) from the Indus Valley depicting an elephant, a necklace (above) made of lapis lazuli and gold beads, and a decorated stone vessel (left) that was likely made by a foreign artisan all suggest that Gonur Depe was at the center of an international trade network.

cosmetics, pots filled with food and drink, and vessels crafted from gold, silver, and bronze. These artifacts attest to the skill of the city's craftspeople, some of whom may have been immigrants from outside the Oxus world. The many amulets, vessels, stamp seals, and mosaics made by these artisans depict mythical beasts and revered local animals such as mountain sheep, humped bulls, birds of prey, snakes, and lions.

The people buried in the necropolis did not go to the afterlife alone. Many were buried with animals, including dogs, camels, goats, donkeys, and some of southern Central Asia's earliest domesticated horses.

One small dog was even found buried with a blanket studded with fine alabaster beads. Some tombs included skeletons that may have belonged to servants or slaves who were sacrificed in order to be buried alongside their masters.

Although the exact political organization of the Oxus civilization remains unknown, such a concentration of wealth, found nowhere else in the city, suggests that a strong social hierarchy existed at the site. Some scholars have speculated that Gonur Depe even served as a kind of capital for a loosely connected political network that extended across the Oxus world, while others suspect that each large Oxus site functioned as the center of an independent, regional network.

WHILE THE OXUS PEOPLE had their own unique artistic motifs and customs, they also welcomed foreigners bearing new ideas, many of which they adopted. Ivory gaming pieces and game boards found in high-status graves may have been carved from elephant tusks imported from the great Indus cities, such as Harappa

in Pakistan. The inspiration for the games themselves may have come from Mesopotamia; the game boards' shapes resemble ones found at the royal cemetery of Ur in Iraq that were used to play "The Game of 20 Squares." The wagons found in the Gonur Depe graves—particularly impractical for long journeys between these far-flung regions—were likely ceremonial, but hint at connections with the Sintashta culture. These nomadic people lived in metal-rich regions of the Eurasian steppe and likely built the world's earliest chariots. It is possible they traded chariots and domesticated horses to the people of Gonur Depe. In return, Oxus traders may have sent textiles made of wool and other materials to the north. There the Sintashta people began to make pottery that incorporated Oxus geometric motifs, which they may have seen decorating Oxus clothes.

Other designs found on Oxus artifacts suggest symbolic connections with the greater Bronze Age world. Leaping bulls on Oxus seals bear an intriguing resemblance to frescoes decorating the palace of Knossos on Crete. A marine shell found in one woman's grave may have come from the shores of the Persian Gulf, where Semitic-speaking kings ruled a country known to Mesopotamians as Dilmun. And it is clear the Oxus culture was attractive to other Bronze Age peoples as well. A typically Oxus seal or amulet decorated with a winged lion was discovered in a Dilmun cemetery. When a silver vase bearing a representation of a hoofed goddess sitting on a throne wearing a woolen skirt known as a *kaunakes* was found near Persepolis in Iran in the 1960s, it was thought to have been made by the Elamites, a Bronze Age people who lived in what is now Iran. But after a similar vessel was found at Gonur Depe, archaeologists realized the Persepolis vase had been fashioned by Oxus artists. Many more artifacts depicting



Copper stamp seals used to denote ownership of goods were found in the graves of many women buried at Gonur Depe's elite necropolis.



women, known as "Oxus Ladies," which include silver pins and stone statuettes depicting seated women or goddesses wearing *kaunakes* have since been found at Gonur Depe and other Oxus sites.

The artifact most recently discovered at Gonur Depe that suggests close links between the Oxus civilization and the greater Bronze Age world is a small cylindrical vessel bearing traces of paint. It was found in the spring of 2019 when Dubova and her team were digging at a site known as Gonur 20, a suburb just over a mile south of the city's main complex. In addition to homes, kilns, and ovens, they unearthed eight tombs in this small settlement, including the grave of a woman buried with the cylindrical vessel. Close inspection of the palm-sized piece revealed hues of brown, black, and ochre that seemed to depict a person brandishing a snake. Many Bronze Age peoples of the Near East and Asia used this motif in their art and it is commonly interpreted as a symbol of the mastery of nature or of power over the underworld.

Yet exotic artifacts can only tell archaeologists so much about the movements of Gonur Depe's inhabitants and the people with whom they came into contact. In a recent study, a large international team of researchers, including Dubova, sequenced the genomes of 523 ancient people from South and Central Asia, including 84 individuals who had been buried at Gonur Depe and other Oxus sites. The results showed that most of the Oxus population descended from Neolithic farmers who lived on the Iranian plateau. Some Oxus people also possessed Anatolian ancestry. These findings demonstrate that the Oxus

A ceramic figurine (left), an alabaster and stone statuette (below), and a silver pin (below right) depict women, who are often shown in Oxus art.



people were at least partially descended from populations that had migrated from these regions. A small percentage of their genetic makeup—around 2 to 5 percent—resembles that of hunter-gatherers of the Andaman Islands in the Bay of Bengal, offering further proof that the Oxus people cultivated extensive links to South Asia. “It’s very interesting that we found a lot more evidence that supports this idea of migration,” says Dubova. “Gonur Depe was a center of migration and culture over this huge ancient world.”

BY 1700 B.C., MEMBERS OF the Andronovo culture, a Eurasian steppe people, were living in southern Central Asia in significant numbers. DNA evidence shows that a few people buried at Oxus sites dating to that period had Andronovo ancestry. Recently, researchers have started to look for archaeological evidence of Oxus life beyond the urban centers, where interactions with this nomadic community may have taken place. “The trend is not necessarily to give up studying cities, but to study them in

A pin in the form of a bearded man found at Gonur Depe was fashioned from silver likely mined by nomads living on the outskirts of the Oxus world.

speculated that the fortifications at sites such as Gonur Depe suggest a certain level of animosity between city dwellers and outsiders. But there is very little in the archaeological record suggesting widespread violence. At Gonur Depe, only a limited number of weapons have been found, including a small selection of arrowheads and ceremonial ax heads found in burials.

It appears that, far from posing a threat, Andronovo populations played a key role in Oxus trade networks. For example, they controlled mines and smelting processes in ore-rich regions of Uzbekistan.

Andronovo cultural practices also seem to have influenced the Oxus people. While the burial customs of Gonur Depe were always diverse, the traditions of steppe people, including cremation and empty burials, started to become more popular among city dwellers in Gonur Depe’s later stages, Rouse says. In her view, the introduction of these new funerary practices represents an influx of new ideas, and perhaps of Andronovo religious beliefs. The relationship seems to have been reciprocal, as Oxus-style pottery molds and kilns have been found at Andronovo campsites.

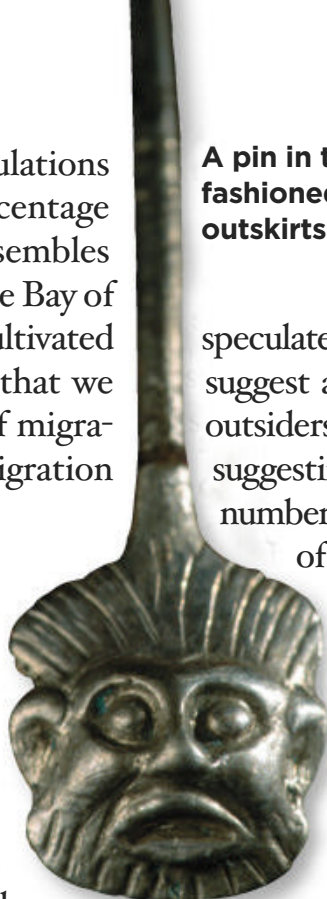
Understanding the relationship between mobile and settled people may help explain why Gonur Depe and, indeed, the entire Oxus civilization, began to decline around 1700 B.C. before vanishing as a distinct culture by 1500 B.C. “The pottery, stone items, and metals were really fine and were really well executed,” says Elise Luneau of the DAI. “All of that disappeared. It’s a complete sociocultural change.” As the prestige items that once defined



A copper ceremonial ax head (top) in the shape of a rooster and a ceramic and gold figurine (above) of a bird of prey are among the many artifacts depicting animals that have been found at Gonur Depe.

the context of their surroundings,” says Lynne Rouse of the DAI. “[We’re looking] not just within the city walls, but beyond the walls, to understand smaller sites like farmsteads, hamlets, or campsites.”

Rouse has focused on such sites, hoping they may yield evidence of the influence nomads had on the Oxus civilization. Some researchers have



Oxus culture lost their allure, so did urban life itself. Eventually, people moved into smaller settlements in the region, perhaps a further sign of influence from mobile pastoralists. Luneau has been surveying valleys in Tajikistan and Uzbekistan where both Andronovo and Oxus graves have been found in an effort to understand how these groups lived alongside each other. She believes they may even have lived in the same small settlements.

Luneau suggests thinking of the end of Gonur Depe and the other Oxus centers not as a collapse, but as an evolution or an adapta-



tion to new conditions. The entire Oxus system was built on its network of intercultural relationships, especially with the societies of the Near East and South Asia. In time, those long-distance partnerships faded, perhaps due to increased warfare in Mesopotamia and Elam or the development of new trade routes in the Mediterranean. If their links to the south grew more unpredictable, suggests Rouse, perhaps the Oxus people intensified their contact with ready partners in the steppes to the north in order to continue securing resources such as tin. “It wasn’t the fundamentally destructive relationship which it’s

A grave (above) of a man buried beneath a mosaic made of heart-shaped ivory inlays, and an ivory game board (left) resembling examples found in Mesopotamia were discovered in Gonur Depe’s high-status necropolis.

often presented as—as if they were incompatible with each other somehow,” Rouse says. Given a better understanding of the complex relationships between settled and mobile people, scholars might no longer consider the shift in the nature of Oxus culture a simplification or downgrade.

“We have this canonical idea in archaeology that you have to have cities, you have to have writing, you have to have monumental architecture, you have to have a certain type of political complexity to have a civilization,” Rouse says. “But I think for a lot of Central Asia and Eurasia, both archaeologists and anthropologists are starting to think about it a little bit differently.” When the Oxus people abandoned their cities, a process that likely took decades or even centuries, they didn’t disappear, she says. It’s likely these formerly urban people adopted some customs and practices of neighboring nomads and continued to farm in smaller settlements. They adapted to changing conditions, and perhaps let go of the memory of the camel caravans and the wealth they had once brought to the desert. ■

Megan Gannon is a journalist based in Berlin, Germany.



UNFOLDING THE

A new theory may explain the origins of the famed

CREATED IN THE ELEVENTH CENTURY, the Bayeux Tapestry is one of the world's most famous textiles, both an extraordinary piece of medieval art and an impressive historical document. The 230-foot-long linen cloth is embroidered with images of more than 600 people, 200 horses, and an array of buildings, ships, and animals—and even captions—that convey the story of William the Conqueror's invasion of England in 1066. William's victory over Harold Godwinson at the Battle of Hastings and seizure of the English throne was one of most consequential events in European history. Yet many aspects of the Bayeux Tapestry remain obscure, including where it was originally intended to be viewed. Was it displayed in a church? In a nobleman's great hall? Or taken from village to village like a traveling picture show? New research conducted by University of York art historian Christopher Norton may have finally put that discussion to rest: He believes it was custom-made to hang in the nave of Bayeux's newly built Norman cathedral.

The first existing documentation of the tapestry is a 1476

inventory that lists it among the cathedral's possessions. Although this might suggest that the tapestry had always been kept there, many scholars think the church only acquired it



An illustration shows how the tapestry may have been exhibited (highlighted) along the 3 sides of Bayeux Cathedral's nave.

reads: "Those men carry arms to the ships and here they drag a cart with wine and arms. Here is Duke William in a great ship..."



BAYEUX TAPESTRY

medieval textile By JASON URBANUS

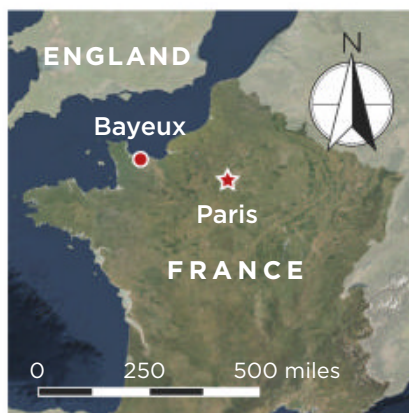
centuries after it was made, pointing to the tapestry's decidedly nonecclesiastical subject matter. "Most surviving textual accounts suggest that embroideries with scenes from contemporary history, rather than religious stories, were more commonly hung in secular settings than in churches," says art historian Tom Nickson of the Courtauld Institute of Art.

Some scholars also contend that the tapestry would not have easily fit on display within the confines of the church. However, Norton argues that both the tapestry's dimensions and those of the church are not now what they were in the eleventh century. He notes that the tapestry has been torn and repaired, stretched and shrunk, and that sections have gone missing over the past millennium. By researching medieval cloth-making, analyzing the textile's composition, and investigating the archaeological and architectural history of the eleventh-century cathedral, Norton has been able to reconstruct the embroidery's original length and the Norman building's dimensions. This produced a seamless match. The tapestry would have fit perfectly if exhibited

along the three sides of the nave, with each neatly containing one of the three narrative sections: the political background to the invasion of England along the south, preparation for war on the west, and the Battle of Hastings along the north.

Several of the tapestry's key scenes would also have lined up with major architectural elements, such as arches and doorways, emphasizing the significance of the events shown above them. For example, Norton believes that the tapestry's precise midpoint, which depicts the pivotal moment of William's embarkation from France, would have hung directly above the cathedral's

main western entrance. He asserts this would only have been possible if the tapestry's designer had created it to hang in this space. "This reinforces the long-held suspicion that the tapestry was probably commissioned by William's half-brother Odo, bishop of Bayeux," says Nickson. In fact, William himself was likely present at its unveiling during the cathedral's dedication in 1077. ■



Jason Urbanus is a contributing editor at *ARCHAEOLOGY*.

Behind the Lines of the Great Arab Revolt

Along an abandoned railroad, traces of a bitter WWI-era guerilla conflict have emerged from the sands

By SAMIR S. PATEL



The now-defunct Hejaz Railroad, shown here at Hallat Ammar, site of an ambush during the Great Arab Revolt, ran for 820 miles, from Damascus to Medina. A surviving piece of rail (right) is inscribed with a dedication to the Ottoman sultan Abdulhamid II.



IN THE NINETEENTH CENTURY, the hajj—the annual pilgrimage to Mecca that all able Muslims are to undertake at least once in their lives—was an act of both great faith and great hardship: a 40-day march through the desert region known as al-Hijāz, or the Hejaz. Traveling south from Damascus along the western side of the Arabian Peninsula, pilgrims might move in groups of 5,000 or more, in columns two miles long. They went by night, fearing Bedouin raids, past Ma'an in what is now southern Jordan, to the Ras en-Naqb escarpment. There they descended 500 feet through a narrow pass called Batn al-Ghoul, the Belly of the Beast, where a shape-shifting djinn was said to lure people to their death in the desert. From there, it was still 750 miles to Mecca.

The journey changed in the first decade of the twentieth century, when the Ottoman sultan Abdulhamid II authorized construction of the Hejaz Railroad, 820 miles of narrow-gauge track connecting Damascus to Medina. Muslim-financed and built by German engineers, the railroad demanded mobilization of labor and capital on an imperial scale. Upon its completion in 1908, the 40-day



journey became as few as two or three. By 1914, 300,000 people, along with supplies for the 10,000-strong Ottoman garrison in Medina, traveled the rails each year. The railroad was a grand symbol of modernity for a multicultural empire that stretched from the Balkans to the Persian Gulf and was meant to strengthen its claim as the caretaker of Islam, even as it strained to keep up with a changing world.

Just a few years later, the railroad would be all but defunct, the Ottoman Empire dissolved, the Arab world failed by its leadership and betrayed and fragmented by its allies in World War I. By some accounts, the Ottomans' dedication to the Hejaz Railroad helped contribute to their defeat in the war, which in turn led to the unmaking of their empire. At least one narrative that has grown around the railway concerns the irregular Arab and British soldiers who sabotaged its tracks and attacked its stations as part of the Great Arab Revolt, despite facing unrelenting desert, superior numbers, greater firepower, and greater military wisdom. To many in the West



there is a singular figure at the center of that story, which ended with the Ottoman surrender of Damascus to Arab and British forces in 1918—Thomas Edward Lawrence, also known as Lawrence of Arabia, a British colonel and former archaeologist who became the subject of adoration, fame, notoriety, and contempt. This story, however, is not about Lawrence, mostly, but rather the shadow cast on the desert by the Hejaz Railroad and the insurgency of which he was a part.

The extent to which the Great Arab Revolt was actually “great,” “Arab,” or a “revolt” is a matter of historical debate. It more or less began with one man—Sharif Hussein ibn Ali, the Ottoman-appointed emir of Mecca. He was a member of the Hashemite family, which had long ruled Islam’s holiest city and claims direct descent from the prophet Muhammad. Emboldened by both the rise of Turkish nationalism in the Ottoman Empire, and a new collaboration he had forged with the British Empire, in October 1915 Hussein declared

himself “King of the Arabs.” Along with his sons, Ali, Abdullah, and Faisal, he then launched a campaign of insurrection against the Ottomans. “It had aspects of a popular revolt,” says Rashid Khalidi, a scholar of modern Arab studies at Columbia University, “but was essentially launched by the Hashemites, in collaboration with Britain, to buttress their dynastic interests and achieve British strategic interests.” Reeling from the disastrous Gallipoli campaign (see “Anzac’s Next Chapter,” May/June 2013), the British supported the Hashemites in opening a new front in the war.

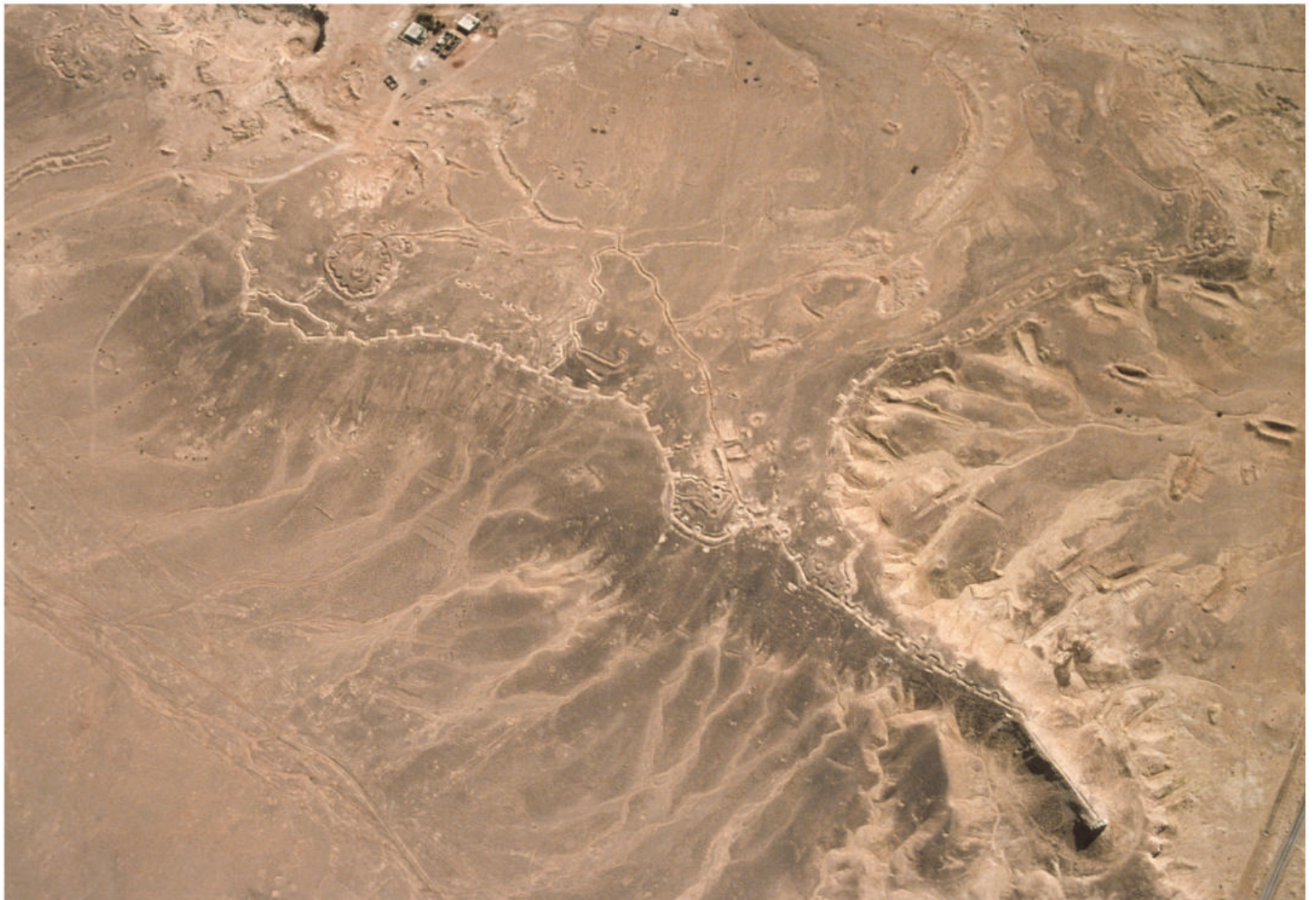
A Hashemite army of a few thousand, led by Faisal, with British support, had mixed early results, but did claim Mecca and the city of Wejh, which helped isolate the Ottoman troops in Medina. A critical success of the revolt came in July 1917, with a daring back-door assault that took Aqaba, a key port in what is now Jordan. Howeitat Bedouins, advised by Lawrence—who is said to have engineered the attack in defiance of orders—conducted the assault, which pushed the war north and set the stage for a year of relentless guerilla attacks on the Hejaz Railroad.

WHEN UNIVERSITY OF BRISTOL archaeologists Nicholas Saunders and Neil Faulkner were selecting a site to begin a three-year exploration of the railroad more than a decade ago, they chose an unremarkable place. Wadi Rutm, a railroad station six miles south of Batn al-Ghoul, consisted of three ruined buildings and little else that had been documented. It was utterly ordinary, which is why they picked it.

On the first day, Faulkner took a group of archaeologists and volunteers to examine the buildings and develop a field plan. “I’d just have been in the way,” recalls Saunders, so he and site director David Thorpe took a walk. About 20 minutes up the abandoned rail bed, they climbed a gentle rise, where they found the remains of a desert encampment, with dugouts, parapets, trenches, and rings of stone that had once held down tents, as



The Arab leader Faisal surveys the front lines in 1918 along with other Arab fighters.



The trench system and hilltop redoubt near Ma'an Station is an example of how Ottoman forces created layered defensive systems.

well as German-Ottoman bullet casings and star-and-crescent buttons. “It’s just one of those times that I think many archaeologists have, when time kind of stands still,” Saunders says.

Within clear sight of the modern highway that now carries the hajj’s pilgrims, the camp provided 360-degree views of the desert, yet was completely hidden and entirely undocumented. “And then we saw that there were improvised defense works in other places,” Faulkner says. “There were trenches. There were hilltop redoubts built of dry stone masonry. And this is a comparatively small area.”

The team’s initial intention had been to record some ruined stations for a few years, but with the camp’s discovery, the project changed. “We were almost certainly looking at a completely unknown, uninvestigated, undocumented conflict landscape on either side of the railway that nobody apart from the Bedouin knew was there,” says Saunders. Three years turned into nine, as the project grew to encompass more of the archaeology of World War I, the Ottoman Empire, looting of archaeological sites, the Bedouin, imperialism, colonialism, the roots of a distinctly modern style of warfare, and a crucible of the modern Middle East.

Saunders and Faulkner’s Great Arab Revolt Project (GARP) was conducted with permission and oversight from Jordanian heritage authorities and colleagues at Al-Hussein Bin Talal

University. According to one of the project’s initial facilitators, Hani Falahat, retired director of antiquities at nearby Petra, a key Jordanian goal was to encourage tourism by Lawrence-loving history buffs. In Jordan, he adds, such recent history isn’t usually considered notable.

“After that first day, we guessed, through experience, that there was this unknown, hidden landscape out there,” says Saunders. “But we didn’t know exactly where it was.” Project members conducted aerial surveys and walked some 60 miles of the rail line to identify more sites like those at Wadi Rutm. “We were just constantly astonished at what we found and often at the state of preservation,” Saunders says. “It became much bigger, and more unwieldy, than we could ever have imagined.” What they saw was an entire landscape that had been heavily and hastily fortified by the Ottomans to defend the railway against guerilla attacks.

Another site the team examined early in the project was Ma’an Station. “We found almost endless fortifications centered on Ma’an Station going out into the landscape,” Saunders says. The team documented more than two miles of trenches, situated to provide wide views, and arranged in layers to create overlapping fields of fire. These defenses extended south down the line on both sides of the railroad, usually within sight of one another to allow communication.



Faisal and T.E. Lawrence confer with Bedouin leaders who supported the revolt.

At Batn al-Ghoul the archaeologists witnessed how the Ottomans defended a weak spot in the railroad. This difficult-to-repair double-hairpin turn was guarded by a constellation of strategically located sites, including Fassu'ah Ridge Fort, a 600-by-150-foot oval fortification between the hairpins. The fort is exceptional because it was a particularly regimented military space, with evidence, including a German perfume bottle, that high-ranking officials operated there. The team also found Neolithic stone tools and centuries-old coins at this and other sites—trinkets evidently collected as souvenirs by curious Ottoman soldiers and then left behind.

In all, GARP has cataloged some 55 significant campsites and more than 800 structures. John Winterburn, the team's landscape archaeologist, until recently a research associate with the University of Oxford's Endangered Archaeology in the Middle East and North Africa Project, says there's reason to believe the same pattern extends along the entire length of the railroad. "I'm researching the same things in Saudi Arabia using satellite imagery," he says. "And many of the features continue southward all the way to Medina."

Although the desert appeared at first glance to be a blank canvas on which the Ottomans painted their defenses, it has a long history. The team found that encampments used by the soldiers overlapped with ones used by workers during the railroad's construction a decade earlier. Some of the fortified areas appear to have been built even earlier to defend against Bedouin raids on hajj pilgrims and traders, and then modified or expanded during the war. "Very often it wasn't possible for us to disentangle with confidence what belonged to what," says Faulkner.

ONE OF THE SECRETS of the desert that GARP uncovered was that it had been heavily weaponized by both sides of the conflict. The guerilla forces used the sand, dunes, and rock formations to appear as if from nowhere, while the Ottomans turned the topography into a fortified castle—perhaps a little like the Crusader castles in Syria that Lawrence had studied in his days as an archaeologist. "You can imagine that you're one of these Ottoman soldiers sitting in a trench or in a hilltop redoubt," says Faulkner. "You can see the vastness of the desert all around you. And you realize that, actually, those camel-mounted guerillas moving through those spaces could strike anywhere, anytime."

In the researchers' reading, the Ottoman militarization of the desert suggests that the Great Arab Revolt's guerilla campaign was effective,

a conclusion that has been questioned. Damages to the railroad were fixed quickly, sometimes within 24 hours, which has led some to assert that the attacks had little impact, and perhaps have been inflated by Lawrence's reputation.

The strategy advanced by British commanders was to tie down Ottoman forces so they couldn't threaten the Suez Canal, which allowed the British to go on the offensive in Palestine and Syria with their right flank protected. It was also



designed to keep the Ottoman stronghold in Medina isolated. “I think in strategic terms, the one major, significant contribution of the Arab Revolt was pinning down between 11,000 and 13,000 Ottoman soldiers in Medina,” says Eugene Rogan, director of the Middle East Centre at the University of Oxford. “Otherwise, the [Arab army] wasn’t a fighting force that could make a dent against the Ottomans.” And tying down all these soldiers—perhaps as many as 25,000, if the soldiers defending the railroad are included along with those in Medina—with a small number of guerillas could have made a difference. “The Ottoman army was stretched thin, fighting on several fronts at once,” says Khalidi. “Except on the Russian front, it was successful until late 1917, defeating the Allies at Gallipoli and the British in Mesopotamia and holding the British up in Sinai.”

Those Ottoman troops who were on hand to defend the railway were effective, in a way. They made creative use of the landscape to protect a large area, and whenever the Arabs and British attacked them directly, the Ottomans almost always won the day—but avoiding those kinds of confrontations is one of the principles of guerilla warfare. The seminal theoretician of this form of warfare was Lawrence. Many things about his life and writings have come into question over the years, but he was an eloquent, if perhaps slightly pretentious, explicator of the guerilla campaign. “Suppose we were...an influence, an idea, a thing intangible, invulnerable, without front or back, drifting about like a gas?” he writes. “Armies were like plants, immobile as a whole, firm-rooted, nourished through long stems to the head. We might be a vapour, blowing where we listed....” Though guerilla tactics, as a form of asymmetrical warfare, have existed for millennia, World War I added modern weaponry to their speed and destructive impact. Explosives, rifles, and motorized vehicles allowed guerillas to emerge quickly, kill or destroy, and then disappear—a strategy that does not work as well with swords and muskets.

Through the second half of 1917 and the first nine months of 1918, guerilla attacks continued up and down the railroad, and Arab and British forces claimed seven stations and 80 miles of track, including Batn al-Ghoul. Coordinated raids cut off Ma’an Station from the north and south. The attacks carried on as the main British forces arrived and pushed through Palestine to Damascus, which was taken by October. The final holdout was the garrison at Medina, which surrendered in January 1919. Its official dissolution took a few years, but with that, the Ottoman Empire was no more.

FOR SOME TIME, it appeared that the most obvious material remains of the guerilla campaign itself the team would uncover would be its impression on the opposing force. These frantically assembled defensive bulwarks, now lightly dusted with bullets, twisted metal, and the camp rings and latrines of thousands of men, waited for a battle that never came. The guerillas themselves would be harder to see in the archaeological record. But things have a way of lingering in the desert.

Late in the campaign, Lawrence and others tested using armored cars in their raids. It was a major development in the evolution of guerilla warfare. The cars, including armored Rolls-Royces, outfitted with heavy guns, made disappearing into the desert easier. Cars and light trucks were later employed to great effect in North Africa in World War II and are still used in modern Middle Eastern conflicts.

Several years into the project, Winterburn was conducting research in the National Archives in London, including studying war diaries and sketch maps from the Royal Air

An image (left) of an armored car at one of the Tooth Hill camps from the collection of Lt. George Pascoe, and (right) the Tooth Hill site today.





Finds from various sites include, top to bottom: Spoons and buttons from the Ottoman era alongside prehistoric stone tools apparently collected by Ottoman soldiers; an Ottoman hand grenade; and British rum jar sherds.

Force (RAF), which had conducted reconnaissance flights over the Hejaz Railroad. He was also looking at old photographs kept by the son of a lieutenant named George Pascoe, who had served in the campaign. Several of these lines of evidence pointed to a site related to the motorized raids called Tooth Hill. “Lawrence talks about returning to a campsite behind the ‘great Tooth Hill,’” says Winterburn. “And that phrase always stuck in my mind: What was the great Tooth Hill?”

Lawrence mentions “our old camp behind the toothed hill facing Tel Shahm station” in his memoir, *Seven Pillars of Wisdom*. “We slept there that chilly night, happy with bully beef and tea and biscuit, with English talk and laughter around the fire, golden with its shower of sparks from the fierce brushwood,” he writes. On an RAF map from April 1914, Winterburn found a feature identified as Tooth Hill. “To be quite honest, I don’t think anybody had previously recognized the significance of the maps,” he says. “The maps only come to life if you have direct experience of being on the ground in Jordan, because you can reconcile features with what’s been described on them.”

The Pascoe photographs added another clue, as some depict armored cars parked in front of a hill that looks like, well, a tooth. “Once I saw the photograph of the Rolls-Royce in front of that distinctive hill, I knew where it was because I’d seen it on the horizon down in the far south of Jordan,” Winterburn says. “It’s such a distinctive shape, I knew instantly where he was.” In 2012, the team found the location on Google Earth, and Winterburn, Saunders, and Faulkner traveled there. “I walked up to where I thought the original photograph was taken and I was getting pretty excited at that point in time,” says Winterburn. “I picked one fragment up and turned it over. And there were the initials ‘S.R.D.’ [Supply Reserve Depot], and that is completely diagnostic. That’s a British Army rum jar.” Such jars are found all over the Western Front but had never been documented in Jordan. Like other sites the team examined, the camp’s remains sat on the surface, barely concealed by windblown sand: two campfires, easily dated ration tins, spark plugs, bits of ceramics and glass, and more than 70 spent cartridges from a .303 British machine gun—the kind that had been mounted on the armored Rolls-Royces. “It’s just one of those moments,” Saunders says, “a Tutankhamun moment.”

With the help of an archival photo—this one

actually labeled “Tooth Hill”—the team found another, even more extensive camp area nearby. It was much more heavily used, clearly a base of operations for raids up and down the rail line in April 1918. There they found cartridges and clips, German stick grenades taken as souvenirs, and separate camps for the Egyptian and Bedouin fighters, who did not get along. “So, we had the archaeology, we had the military history, we had *Seven Pillars of Wisdom*, and we had our detailed knowledge of that landscape,” says Saunders. “And that’s what I like to think made it work and made us able to tell an extraordinary story, which would have been impossible if all of those things hadn’t come together.”

One unexpected outcome of the finds at Tooth Hill, and later ones at Hallat Ammar, where Lawrence’s descriptions of the landscape and the distribution of debris also match up well with artifacts on the ground, is that Saunders and Faulkner have found Lawrence to be a reliable narrator. That’s not generally his reputation among many historians. “His analysis of Arab politics is superficial and inaccurate, while he greatly inflates his own role and underplays those of other British officers and experts,” says Khalidi. Interviews with revolt veterans conducted by Jordanian historian Suleiman Mousa, he adds, “indicate that his Arabic was poor, and that no one was fooled for an instant that he was an Arab.” On the other hand, says Rogan, “*Seven Pillars* is, for many of the encounters, the only eyewitness account we’ve got.” In general, for every chance Saunders and Faulkner had to test Lawrence’s factual recollections against the archaeological evidence, they found that “the memoir is



Armored cars like the one at the front of this group were used by guerilla forces late in the Great Arab Revolt. Such vehicles helped change the nature of guerilla warfare during World War I and were later used during World War II in North Africa.

an exceptionally reliable war memoir,” Faulkner says. “I think that’s important for evaluating Lawrence’s contribution as a military practitioner and a theoretician of guerilla warfare.” Later in life, Lawrence became a semi-recluse, guilty over the British betrayal of the Arabs following the war, overwhelmed by the fame his role in the revolt brought him, and not others who had been just as involved, and almost certainly deeply impacted by post-traumatic stress disorder. He died at 46, following a motorcycle accident.

The Hejaz Railroad survived the war, in a limited fashion, but was completely defunct by 1925. There was an attempt to revive it in the 1960s, and one segment did reopen for industrial use. Eventually the modern highway and airports would change the hajj for good. The most significant legacy

of the period of the Great Arab Revolt is not infrastructure, but sociopolitical structure. Although the Hashemite family still rules Jordan, promises they thought they had received of British recognition of Arab independence came to naught as the British and French carved up the region into imperial protectorates. The railroad and the revolt were, Khalidi says, a major factor in the development of Arab nationalism and the shape and ongoing tension of the modern Middle East. In some sense, the Great Arab Revolt has been revised into a moment of Arab awakening. Though it grew from political and dynastic ambitions both personal and imperial, in the ensuing decades it has become a formative moment for Arab identity. ■



Fassu’ah Ridge Fort was the defensive anchor of the double-hairpin turn at Batn al-Ghoul, a weak point for the Hejaz Railway.

Samir S. Patel is a contributing editor at ARCHAEOLOGY.



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A 4,000-year-old ring enclosure near Pömmelte in central Germany has been reconstructed after extensive excavations recovered the ring's original dimensions.

LETTER FROM WOODHENGE

STONEHENGE'S CONTINENTAL COUSIN

A 4,000-year-old ringed sanctuary reveals a German village's surprising connections with Britain

by **ANDREW CURRY**

In the middle of a potato field not far from the small village of Pömmelte in central Germany, University of Halle archaeologist Franziska Knoll unrolls a five-foot-long piece of paper and tapes it to the graffiti-streaked side of a shipping container full of recently excavated artifacts. A set of concentric circles fills one corner of the paper. Under that, dozens of rectangles, all oriented in the same direction, march along the length of the page. The blueprint is the fruit of three years of excavation that has involved everything from earthmoving equipment to tweezers.

The dig's scale is hard to fathom. In 2020 alone, a 15-person team from the State Office for Heritage Management and Archaeology Saxony-Anhalt excavated more than six acres, in trenches as long as several football fields laid end to end.

Knoll has to raise her voice to talk over the rumbling of a 28-ton Caterpillar 323 excavator carving a new trench nearby. The rectangles on the paper, she explains, represent the outlines of dozens of houses, traces of a settlement that thrived here at the dawn of the Bronze Age. The

circles represent the remains of a large wooden sanctuary that was built at the same time as the neighboring village. "It's the largest Early Bronze Age settlement we know of in Central Europe," Knoll says. "We've found sixty-five houses so far. This must have been a really significant place."

The excavator's operator maneuvers the machine's metal bucket to scrape away a foot or so of dirt at a time while one of Knoll's team members in a hard hat and steel-toed boots keeps a close eye on the soil. He is looking for dark patches that contrast against the

LETTER FROM WOODHENGE

light-brown soil—the decomposed remnants of wood posts sunk into the earth more than 4,000 years ago. When he spots one, he marks the posthole with a metal spike and fluorescent pink spray paint so it can be precisely mapped and, later, carefully excavated.

Unspectacular as the postholes at Pömmelte may appear, their discovery has the potential to resonate far beyond central Germany. The results of excavations here over the last 15 years suggest that the site is closely linked to Stonehenge. Knoll argues that Stonehenge and Pömmelte, or, as she calls it, Woodhenge, are in fact siblings. She thinks the wooden structure may perhaps even have been built by people who had visited the better-known British monument. Hers is a view of Europe's distant past that wouldn't have been possible 30 years ago. Pömmelte is located in the state of Saxony-Anhalt, which, until 1990, was part of East Germany. Under Communist rule, aerial surveys were not possible, but the fall of the Iron Curtain and Germany's reunification opened up a new era of archaeology in eastern Germany. For the first time, comprehensive aerial surveys allowed archaeologists to search for traces of structures invisible at ground level. Because the disturbed soil in ancient ditches or pits holds more moisture, crops planted there grow taller and greener, and the footprints of ancient structures show up as swaths of darker plants in the middle of farm fields.

Aerial photos taken in 1991 revealed the existence of Pömmelte's posthole rings, along with almost a dozen similar enclosures in the region. Preliminary excavations showed that most had been built in the Neolithic period, about 7,000 years ago, or



perhaps even earlier. Until excavations at Pömmelte began in 2005, archaeologists assumed it, too, predated the Bronze Age by millennia. “We didn’t think it was possible to have a Bronze Age ring here,” Knoll says. “We assumed they were all much older.”

But not only was the ring at Pömmelte much bigger than the region’s other rings, test excavations confirmed that it was also much younger, with radiocarbon dates placing its earliest phases around 2300 B.C. That put it squarely at the end of the late Neolithic or beginning of the Early Bronze Age, an era of transition that began in the fourth millennium B.C. and saw innovations such as met-

not only concentric rings constructed of oak posts, but also dozens of graves and pits filled with sacrifices and offerings. “What was surprising was the complexity—the complexity of the structure itself, and the complexity of the findings that definitely indicated the site was a sanctuary,” says archaeologist André Spatzier of the State Office for Cultural Heritage Management Baden-Württemberg, who led the initial excavations.

By documenting the postholes, archaeologists were able to reconstruct the sanctuary’s dimensions. Its outer circle is about 130 yards across, and an inner palisade of closely set logs forms a sort of enclosed inner sanctum. A few years ago, local authorities recreated the ring, placing black locust logs in the exact spots archaeologists had identified postholes. They also added some imaginative

embellishments. Since nothing but the decayed bases of the logs has been uncovered, the decorations seen today—geometric patterns in red and black, carved animal shapes, and even a few carved human skulls—are purely speculative. Even so, wandering among the 10-foot-tall posts gives visitors a sense of just how large the Bronze Age sanctuary was.

From atop an observation platform that offers a sweeping view of the reconstructed sanctuary and the surrounding countryside, the effort that must have gone into building and maintaining the site becomes evident. “That’s a lot of work,” Knoll



A diagram shows the outlines of dozens of Early Bronze Age longhouses near Pömmelte’s ring enclosure. It was the largest such settlement in Central Europe.

alworking, the development of social hierarchies, and the wheel spread across Europe.

These dates prompted project archaeologists to fully excavate the structure in 2005. As they dug deeper, they were stunned at what they found. Their excavations exposed

(continued on page 62)

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LETTER FROM WOODHENGE

(continued from page 60)

says. “Somebody must have ordered it, and it’s not a project for ten or twenty or even one hundred people. It’s a society-wide effort.”

About a half mile away from the Pömmelte ring, another excavator and a few white vans are parked. There, it’s possible to spy archaeologists working at a smaller ring sanctuary called Schönebeck, where excavations have just begun. Knoll says Pömmelte and Schönebeck were probably linked via a ceremonial pathway, forming a larger ritual landscape similar to the one that sprawls around Stonehenge.

Twenty-nine pits in Pömmelte’s main sanctuary’s outer circle hint at what went on inside the rings, where hundreds of people could have gathered. Some of the six-foot-deep pits contained drinking vessels and cow bones with cut marks. Others were filled with stone axes and grindstones. Archaeologists also found a handful of miniature ceramic vessels, along with the shattered fragments of larger pots and drinking cups. Still other pits had more grisly contents—researchers uncovered the skeletons of women and children, some with marks on their

bones indicating they died violently. One woman had her hands behind her back, as though she had been bound. “The fact that they were put in these pits suggests that was also part of a ritual somehow,” Knoll says.

Around 2050 B.C., the last ceremonies were held at Pömmelte after it had been used for about 300 years. What happened then is unclear, although the presence of charred wood points to the outbreak of a major fire. “The ring burned or was burned,” Knoll says. “But there are no mass graves, no signs of an attack. And they wouldn’t have just left it behind.” After a blaze that must have lit the night sky for miles around, what was left of the burned posts was pushed into the ring’s trenches and covered over, likely as part of a planned ceremony or event.

In the course of her current excavations, Knoll and her team have reopened excavations at the site in the hopes of understanding why the rituals at Pömmelte ceased. The people who erected the first posts were part of the widespread Bell Beaker culture, named for their distinctive pottery made between 2800 and 2300 B.C.

found at sites from Ireland in the West to Bohemia and Poland in the East, and south all the way to the tip of Spain. During the Bell Beaker period, metal artifacts began to become more common and to replace the stone tools of previous eras. At the same



Carved skulls decorate the tops of some of the ring enclosure’s reconstructed posts. The skulls are not based on actual finds from the site, as the posts were burned, but are an artist’s imagining.

time, people’s houses became larger and settlement styles began to change. Bell Beaker burials appear similar all over Europe, and often contain weapons, including daggers and bows, along with stone wrist guards. But by the time the ring was dismantled, the Bell Beaker period was over at Pömmelte.

The world around Pömmelte had changed, too. Nearby excavations of grave mounds and settlements show that by 2000 B.C., metal was even more common, and the area had become more interconnected, with village chiefs and local clans united under powerful leaders. Rather than spending their resources on ring sites that served the region’s broader population, communities started pouring them into massive grave mounds for Bronze Age princes, their oak-walled burial chambers filled with gold and bronze finery—similar to the large mounds, or barrows, created at Stonehenge around the same time. “It’s clear that the sacral landscape flourished between 2400 and 2000 B.C. and then it came to an end,”



One of the huge trenches archaeologists have excavated at Pömmelte. In the summer of 2020 alone, they dug more than 6 acres of the site.

Spatzier says. “We see the rise of Early Bronze Age elites at the same time. It’s not a coincidence.”

According to University of Southampton archaeologist Joshua Pollard, something similar happened in Britain. “We find a very similar sequence with Stonehenge,” says Pollard, who has been excavating sites near the monument for more than a decade. “As we go into the Early Bronze Age, we see increasing numbers of people buried within the landscape and the creation of big barrow graves. But, by the time you hit 1600 B.C., there’s no more construction or meaningful activity at the site.”

Though Stonehenge’s massive stone pillars are world-famous and it’s only possible to reconstruct Pömmelte from stains in the soil, the German sanctuary actually has something Stonehenge doesn’t, at least thus far. For 300 years, a sizable village thrived next door. Archaeologists from the University of Halle have spent several months each summer for the past five years uncovering traces of this ancient settlement.

Over more than 3,000 years, Knoll explains, a foot or more of topsoil has disappeared from the settlement site as a result of intensive farming and taken the floors of the ancient longhouses with it. Because so little is left on the surface, Knoll and her team can open up huge swaths of the site using an excavator without worrying about disturbing hidden artifacts. “We’ve lost that top layer, so we don’t have hearths or benches or other interior details,” Knoll says. What’s left below the surface are the remains of posts that once held up roofs and walls made of sticks covered

with a mixture of clay, dirt, and straw. Walking across an open trench, Knoll moves in and out of early Bronze Age longhouses, visible in a sort of connect-the-dots outline. This has provided enough information to sketch out the dimensions and floor plans of the dwellings that appear on the blueprint.

Pointing to the spikes and circles of paint dotting the soil, Knoll explains that the longhouses can be divided into two periods. In the settlement’s Bell Beaker period, when the oaken posts of the nearby ring were freshly cut, the longhouses were slightly narrower at one end. In its final century or two, they were perfect rectangles. All of the longhouses were oriented west to east, and their narrow western walls were solid, offering protection from the steady winds that blow across the open landscape. Each house had a single door on its southern side, sheltered by a sort of foyer or windbreak.

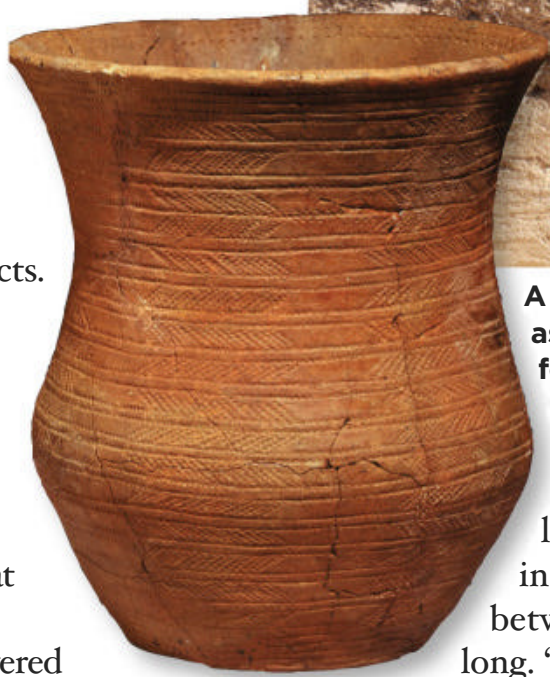
weren’t single-family houses,” Knoll says. “They were shared by more than one family or belonged to a single clan.” And families didn’t just share the space with other families—all the houses are open on the eastern end, probably evidence that part of each structure housed cattle.

Although researchers have mapped out 65 houses in total thus far, radiocarbon dating of burned wood recovered from the postholes shows that only a dozen were standing at any one time. With no fireplaces or any other clues to piece together the interiors, it’s hard to pin down how many people lived in each house, but Knoll thinks between 20 and 30 is a good guess. This means that Pömmelte’s permanent population was a few hundred at any given time, a sizable number for the Early Bronze Age.

At the far end of a large trench, a handful of students from the Uni-



A clay pot from Pömmelte (above) in an underground pit that served as a sort of prehistoric refrigerator. A similar vessel (left) was found near Stonehenge. Both are examples of pottery produced by members of Europe’s Bell Beaker culture.



Other than that, the longhouses vary only in their length, ranging between 50 and 100 feet long. “I am certain these

versity of Halle are kneeling in the reddish dirt, carefully scraping out a final few postholes. Though postholes are the most common find on the site, there are human burials, too,

LETTER FROM WOODHENGE

some just a few feet away from the houses. Deep holes containing broken pottery and animal bones, some with wood floors, dirt steps, and large ceramic vessels, suggest the people of Pömmelte stored food below ground. “This might have served as a kind of prehistoric fridge, cooling its contents,” explains Knoll. Eventually, the pits were repurposed as trash deposits and filled up with animal bones, pottery fragments, and charcoal before they were covered and abandoned.

The burials, together with the ample contents recovered from the storage and trash pits, are evidence of Pömmelte’s thriving, healthy population, nourished by the region’s fertile land. “It’s some of the best black-earth soil Germany has to offer,” Knoll says, so much so that even today German seed companies use the fields nearby to test new varieties of plants. Bones from the storage and trash pits show Bell Beaker farmers supplemented wheat such as emmer with meat from cows, sheep, and goats. There are also plentiful shells, suggesting that freshwater mussels from the nearby Elbe River rounded out the menu. What’s missing from the site is also significant. “The settlement wasn’t fortified,” Knoll says. “That shows there were no big threats from outside. It must have been a peaceful time.”



A recently excavated burial at Pömmelte is similar to Bell Beaker burials found all across Europe, in which individuals were interred curled on their sides, facing the rising sun.

The discovery of Pömmelte and other Early Bronze Age ring structures in Germany over the past 20 years has presented archaeologists with a conundrum. Pömmelte’s concentric rings may have been made of tree trunks driven into the ground, but in terms of scale and design, the Pömmelte sanctuary and Stonehenge are nearly identical. “They share a family resemblance,” Pollard says.

But until very recently, there was little discussion of meaningful connections between Bronze Age Britain and Germany. For much of the twentieth century, archaeologists thought of Bell Beaker as a kind of package of ideas and technology that spread across the continent by word of mouth, not by people migrating. “Models of social change tended to focus on change being internal,” Pollard says. “There wasn’t much need to reflect on the possibility of wider connections.”

As a result, British archaeologists long viewed Stonehenge and the other rings and ritual structures nearby as a local phenomenon, a British invention that had few parallels in the rest of Europe. “In the U.K., we tend to think of the late Neolithic as something quite insular,” Pollard says. The discovery of Pömmelte and other European sites prompted archaeologists to take the idea of regional con-

nections more seriously. But it wasn’t until geneticists at Harvard University analyzed the DNA preserved in hundreds of prehistoric British skeletons in 2018 that the picture came into sharp focus.

The DNA results confirmed that Bell Beaker wasn’t a matter of cultural change, but of mass migration. Studies had already shown that people migrated from the steppes of Ukraine and Russia to central Germany around 2800 B.C., replacing the Neolithic farmers who had lived there for millennia. Shortly before construction on the final phases of Stonehenge began, about 2500 B.C., DNA results show, this same group arrived in Britain from central Europe. Their genes match those of Bell Beaker people living in the area around Pömmelte during the same time period. “Thanks to genetics, we have good evidence of human movement,” Pollard says. “From 2500 B.C., we have people coming over from continental Europe and settling in Britain.”

That understanding, coupled with the artifacts uncovered at Pömmelte, offers a new explanation of the similarities between the two sites. Both, Knoll says, were the product of a single culture that spread across Europe around 2500 B.C. and shared material culture, technology, and perhaps language. And people from the two locations were probably in regular contact.

While Stonehenge is aligned with the summer solstice sunrise, the entrances to Pömmelte’s massive rings are oriented to sunrise on the days halfway between the solstices and the equinoxes. “We call it the German Stonehenge because the beginnings are the same—it’s got the same diameter, just a different orientation,” Knoll says. “They’re built by the same people.” In fact, Stonehenge, whose first phases are slightly older than Pömmelte’s, may even have been the blueprint for the German site’s wood rings. “It’s not coincidental,” says Knoll. “It’s coming from the same culture, the same view of the world.” ■

Andrew Curry is a contributing editor at ARCHAEOLOGY.



THE ARCHAEOLOGICAL INSTITUTE OF AMERICA: 142 YEARS AND COUNTING

Since it was established in 1879, the AIA has championed archaeology and archaeologists and shared the wonder of discovery and of the past with people all over the world. In this, the year's first "Dispatches from the AIA," we would like to remind readers that the Institute's mission has remained unchanged for 142 years:

The AIA promotes archaeological inquiry and public understanding of the material record of the human past to foster an appreciation of diverse cultures and our shared humanity. The AIA supports archaeologists, their research and its dissemination, and the ethical practice of archaeology. The AIA educates people of all ages about the significance of archaeological discovery and advocates for the preservation of the world's archaeological heritage.

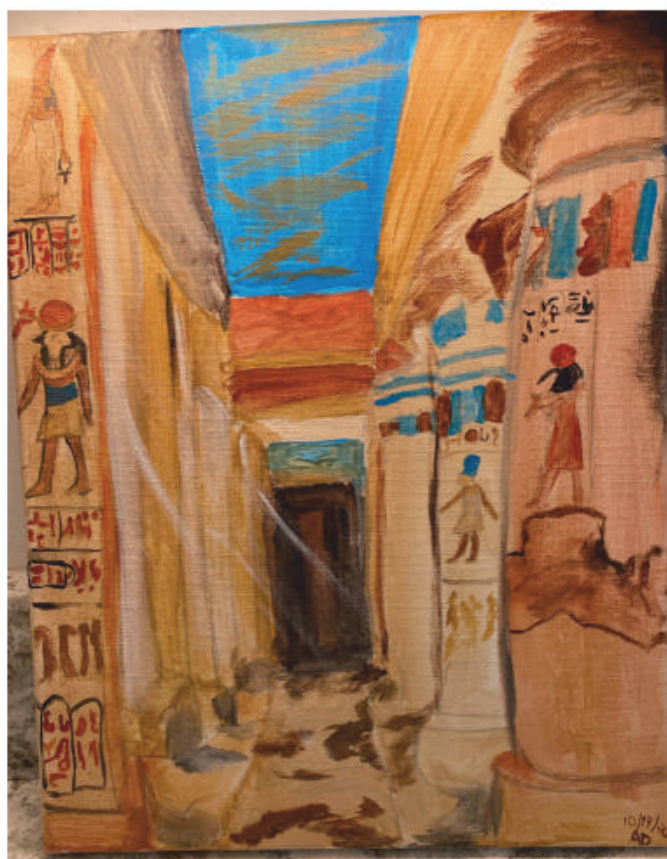
Each year, we create an incredible variety of archaeological activities, materials, and resources for professionals and the interested public. You can find information and details on our website and our social media channels, in *ARCHAEOLOGY* magazine and the *American Journal of Archaeology*, and of course, here in "Dispatches from the AIA."

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If you are interested in finding out what happens when hundreds of archaeologists can't attend an in-person meeting but still want to get together, join us for our first-ever virtual Annual Meeting. This is an opportunity for you to attend outstanding lectures from experts and participate in academic sessions, workshops, and roundtables over six days, from January 5 to 10, 2021. To learn more about how you can participate in the meeting from home, visit archaeological.org/annual-meeting.

YOUR SUPPORT IS CRITICAL

The AIA is North America's largest and oldest nonprofit organization dedicated to archaeology. The Institute's commitment to excavation, education, and advocacy is made possible by the generosity of our donors. Help support our mission by making a gift online at archaeological.org/donate or by texting "GIVE" to 833-965-2840.



ARCHAEODOODLES WINNERS

Congratulations to Annemarie DeMarco and six-year-old Phoenix for winning the AIA's first ArchaeoDoodles contest! Participants, divided into adult and youth categories, were asked to bring the AIA's glossary of archaeological terms to life by illustrating one of 15 terms. The winning entries were for the terms "hieroglyphs" and "canopic jars." Winners were selected by popular vote. You can see all the entries at archaeologyday.org/archaeodoodles.



DISPATCHES

FROM THE AIA

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Once again, our “Year of Archaeology” calendar features stunning archaeological images from around the world that were submitted to the AIA’s Annual Photo Contest. Our calendar makes a wonderful gift for the archaeology enthusiasts in your life. Proceeds support

AIA programs, including our site preservation efforts, which help protect and preserve over two dozen sites around the world. Buy yours today at archaeological.org/calendar.

IAD 2020 FOCUSES ON VIRTUAL PROGRAMS AND COLLABORATIONS

International Archaeology Day (IAD) is the AIA’s largest international outreach program and usually features hundreds of in-person archaeological activities. Celebrating IAD in 2020, however, forced us to rethink things. We shifted from in-person events to a mostly virtual celebration. Where in the past we had supported site visits, museum tours, and archaeology fairs, this year we focused on virtual exhibits, self-guided driving tours, webinars, and activities from home. We were still able to provide programming to hundreds of thousands of participants and expand IAD’s global reach.

In addition to encouraging virtual celebrations, the AIA strengthened our connections with collaborating organizations. Knowing that people were concerned about the transition to virtual programming, we hosted a series of listening sessions to discuss the effects of the pandemic on outreach and engagement programs and to provide the support and resources that people needed to continue their efforts as they moved online.

We also increased our engagement with the public through virtual participation opportunities including online contests such as Build Your Own Monument and ArchaeoDoodles. We hosted four tweetathons to raise awareness of archaeology and the work that archaeologists do. These tweets reached a potential audience of more than one million people. We will build on these efforts as we start planning for the next IAD, October 16, 2021. We don’t know yet what IAD 2021 will look like, but we do know that the AIA will once again be leading a global celebration of archaeology and our shared heritage.

NEW ON THE AIA WEBSITE

The AIA recently launched a new feature on our website: “Archaeologists You Should Know.” It celebrates the work of diverse scholars, past and present, by profiling a different archaeologist each month. These profiles highlight each archaeologist’s life, work, and contributions to the field. Visit archaeological.org/archaeologists-you-should-know to be inspired by the excitement of discovery.

In November 2020, the AIA wrapped up its first series of Abridged Archaeology talks—free 20-minute online lectures on a variety of topics. Award-winning Stanford University archaeologist Patrick Hunt delivered three live talks: “The Fall of Civilizations: Famine & Climate Change,” “Ötzi the Iceman’s Prehistoric Medical Kit,” and “Four New World Foods That Dramatically Changed European Lifestyles.” Stay tuned for announcements about our next Abridged Archaeology series.

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An important part of AIA’s mission is to support archaeological research and the publication and dissemination of results. Each year we provide support in the form of research grants, project fellowships, book awards, field school scholarships, museum internships, and more. Learn more and see application deadlines at archaeological.org/grants.

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AIA CONDUCTS MEMBER SURVEY

We want to thank everyone who participated in the AIA member survey. Your feedback will help us improve our members’ experience, and we are grateful.

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Five hundred years ago, someone stood in a rocking boat or on a swaying raft, grasped the ropes threaded through holes on the sides of a stone box, and lowered the box to the bottom of Lake Titicaca. It came to rest on the K'akaya Reef, where it remained undisturbed for centuries. When Université libre de Bruxelles archaeologist Christophe Delaere first saw the box during a dive on the reef, he was both excited and surprised. Similar boxes had been found on the Khoa Reef some distance away, but this was the first to be found at K'akaya—and, unlike the great majority of other such boxes found in the lake, it was still tightly sealed. Inside he found a gold cylinder and a tiny camelid carved from shell, symbols of the Incas' affluence and power. "Camelids embodied wealth and were extremely valuable animals as they provided food, transportation, wool, and company," says Delaere. "Gold was also very valuable, particularly as a representation of the sun god, Inti. The Incas identified themselves as the progeny of the sun, and the Inca emperor was seen as both the son of the sun and his incarnation." Delaere and his colleague José Capriles of Penn State University suggest the gold foil roll may be a miniature version of a *chipana*, a type of bracelet worn by Inca noblemen on their right forearms, and that it may originally have been placed atop the camelid as a representation of a llama caravan and its cargo.

As the Incas' birthplace, Lake Titicaca was a pilgrimage destination throughout the empire's history, explains Capriles. But the journey to make such dedications was not an easy one. "It was likely very challenging to make an offering here," says Delaere. "Even today, with wooden boats propelled by gas engines, it's still difficult. It makes you think about the skill that Lake Titicaca sailors had, not to mention the complexity of their reef boats."



WHAT IS IT
Box with votive offerings
CULTURE
Inca
DATE
15th or 16th century A.D.
MATERIALS
Andesite, <i>Spondylus</i> shell, gold foil
FOUND

DIMENSIONS
Stone box: 14 by 10.6 inches; camelid votive: 1.5 inches long; gold foil votive: 0.9 inches long

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